Electrical Review

Vol. 79—No. 4. CHICAGO, SATURDAY, JULY 23, 1921. Page 113.

Better Salesmanship Will Create More Appliance Trade

Business Conditions Must Now Depend Entirely Upon Selling Ability of Contractor-Dealer—Unusual Conditions of Past Few Years Did Not Call for Serious Selling Efforts Now Necessary

By TOM CASEY

Vice-President, Hurley Machine Co., Chicago.

"Conditions are bad." From coast to coast, and from Canada to Mexico, this statement is repeated day after day by electrical merchants to explain the tremendous discrepancy between their sales of 1920 and 1921.

But are conditions bad? Before we can answer this question we must know what constitutes "bad conditions." Usually it is one or more of three things; slow deliveries of merchandise which make it difficult to maintain stocks, a stringency in the money market which forces the banker to tighten his lines of credit and deprive the merchant of capital required to run his business, or a scarcity of money in the community which makes it impossible for people to buy.

It is hardly necessary to say that the first condition does not obtain at present. But what about the second? It is true money has been extremely tight with many of the banks and interest rates have been so high as to be almost prohibitive for the dealer who was forced to borrow. But there are many manufacturers who render splendid assistance to the dealer in the way of carrying installment paper, assisting in advertising and other ways that relieve his financial burden, and to what extent has the electrical

Attractive Interior of an Electrical Store that Is Going After the Business and Getting It.

merchant taken advantage of this financial help?

Probably the majority of dealers would say that money is scarce in their respective communities and that it is this scarcity of money which prevents more general buying. Statistics

Window Trim that Attracts Attention.

furnished by the banks, however, do not confirm this opinion. Reports from banks in every section of the country show that their savings accounts have been higher during the last few years than ever before in the history of American banking and even today, after almost a year of business depression, the total amount in saving accounts is higher than at any time before the war.

It is true the buying public as a whole are not spending their money as lavishly today as during the last 5 yrs. Many men are out of employment, others are working only part time, and the natural result is a falling off in their purchases which slows up general business. Yet this is by no means proof that there is no business, as many of our electrical merchants would have us believe.

In every community a large percentage of the population is still employed and in the majority of cases these people are being paid just as much money today as during boom times of bygone days. This point came up at a recent sales conference when a salesman asked one of the speakers what he would do in cases where he found that people were out of work or only working part time. The answer came quick and snappy, "Let those people alone—keep away from them—devote your time and efforts to the people who are still working. You have thousands of them who are making just as much money today as during the last 4 or 5 yrs. Go after these people and you will be able, if you are a capable enough salesmen, to give them the right reasons for giving you their orders."

More Aggressiveness Needed to Develop Greater Volume of Business.

And right here we have the answer to what is generally considered one of the most serious problems of these troubled times. It is not conditions—it is the man. Let's turn the searchlight on ourselves and see what we find. Are we standing by resignedly with folded arms, looking wistfully into the past for the return of the joyous times of yesterday when the cash register clinked merrily "from early morn to dewy eve?" or are we up and doing, fighting aggressively for what business there is, and using our brains to develop more?

Until the electrical merchant develops the habit of analyzing his business and the conditions that surround it, we can hardly expect the volume of business that should be produced in our electrical stores. Every retailer who handles appliances should have a careful analysis of his own community. He should know the population, the number of electrically wired homes, the number of people out of work, the number working only part time and the number who have steady employment and have not been affected by the business slump. In cities like New York, Chicago, Philadelphia and some of the other large centers it is hardly likely that the dealer can secure accurate figures on some of these points, but it must be borne in mind that in these places the population is so large that there are always thousands of people who can afford to buy appliances and are willing to do so when the salesman gives them the right reasons for spending their money.

With an analysis of this kind before him the dealer knows exactly what he may expect. There is no occasion for guesswork, theorizing or experimenting—he knows how many people he has to work on and it then becomes a question of good salesmanship and the right methods of merchandising.

We have an excellent example of "Conditions" in the experience of Detroit concerns who handle electrical appliances. It is hardly likely that any other city in the United States felt the slump more keenly than Detroit, and the number of people out of employment there during the worst part of the depression has been estimated as high as 300,000. Yet the T. B. Rayl Co., for instance, maintained a surprisingly good volume in its high-priced appliances. Cleveland and Pittsburgh are two other cities which were very severely affected by the depression and in both of these places the electrical dealers with efficient

This Display Will Attract "Window Shoppers."

sales organizations have maintained a good volume of business.

Back in 1912 it was a common thing for manufacturers of the higher-priced appliances to be told by dealers: "Your merchandise is all right; we believe in it and we would like to sell it, but it won't go here. These people won't pay that

much for appliances." Nevertheless, in these same towns people built expensive houses, fitted them up with beautiful lighting fixtures, high-priced rugs, pianos, phonographs, and all the other things that go to make up a well furnished home. Still the electrical dealer seemed convinced that although his customers were willing to spend their money for other articles that sold for many times the price of his electrical goods, they would not put their money into appliances that meant more in the way of comfort, convenience and labor and time saving than anything else in their homes.

Right Merchandising Methods and Real Salesmanship Produced Results.

That these men were absolutely wrong was proved in hundreds of cases where the manufacturer placed his line in the hands of other dealers who promptly started a profitable turnover through right merchandising methods and aggressive salesmanship. And today, after 6 yrs. of unparalleled demand for electrical merchandise of every kind, because we have had a few months of poor business, because some of our customers are unable to buy and others who have money are more conservative about spending it, thousands of our electrical dealers seem to have fallen back into the old way of thinking and apparently are convinced that, "It can't be done in this town."

We have 110,000,000 people in this country and these people not only must live, but they are living. They are buying clothing, shoes, hats, groceries, meats and dozens of other things that are necessary to the life and comfort of man. This means that their money is being circulated, that it still follows the old familiar channels from buyer to seller and back again to the buyer, and as long as money is in circulation there will be enough of it in someone's hands to buy electrical appliances from the men who are aggressive enough in their sales methods to make these people realize the necessity of electrical devices in their homes.

More analysis, more careful constructive thought, more aggressive merchandising, more advertising and more salesmanship—those are the things that are needed to pull our electrical business out of the hole into which it has been allowed to fall because too many of us have been sitting back waiting for "conditions" to improve.

We are rapidly approaching the time when there will be only two kinds of electrical merchants—the "live" and the "dead." One class will be conspicuous by their efforts in advertising, salesmanship and service—the three great essentials of successful retailing—the other by the red flag over the door and the noisy chatter of the auctioneer as he pleads, wheedles and scolds in his hopeful attempt to satisfy the creditors. Mr. Dealer, are you going to fight for your place in the former class, or are you going to let the mistaken idea of "conditions" put you into the latter?

To men who have analyzed the business conditions in the electrical industry today it is plainly apparent that in the sale of electrical goods the greatest necessity is more salesmanship and better salesmanship. The statement has been made repeatedly that the electrical dealer has lost about 6 yrs. in his development as a merchandiser. Previous to 1915 most of the manufacturers of electrical appliances devoted a great deal of time and money to educational work among their dealers, with the one idea in mind of making them better merchants.

Early in 1915 the big increase in the demand for electrical appliances of all kinds began to tax the capacities of our factories, and the natural result was the termination of all efforts to increase the merchandising efficiency of our electrical dealers. There was no use in trying to educate salesmen, or to help dealers in their development into scientific merchandisers while manufacturers were unable to supply the demand for their product, and as this condition held until the middle of 1920, there was of course no further effort made on the part of the manufacturer to develop either salesmanship or merchandising ability on the part of his customers. In fact, many manufacturers feel that the tre-

Window Display of a Contractor-Dealer Who Has Good Storekeeping Methods.

mendous business done by electrical dealers in the last 6 yrs. has had a bad effect on their merchandising ability because it has not been necessary for them to make a strenuous effort to secure business, and the result was a slowing up in the sales organization as well as in the dealers' methods to increase their volume.

Dealer's Task to Convince Public That They Need His Goods.

But today the dealer must sell his merchandise and there was never a greater need for high-class salesmanship in our electrical stores. Why talk about "conditions" while the streets are full of

Illumination Sells Goods from Showcases.

automobiles, people are wearing expensive clothes, the theaters are full, the baseball fans are fighting for tickets to see Babe Ruth and people are spending their money in countless other ways? In the larger cities thousands of people go to work day after day. Stand in the business district of any city in this country between 8 and 9 o'clock in the morning and you will see hundreds of people getting off the street cars going to their daily work. Go to the railroad stations and you will find hundreds of others coming in from the suburbs to take their places in the establishments which are paying them just as much money today as they earned a year ago.

It is true people are not spending as much money as they have for the past 6 yrs. It is also true that they are more careful about the things they do buy, but it is equally true that they are buying, and the man who looks into the situation will find that the people who are doing the business are the men who have enough sales ability to convince the public that theirs is the merchandise that should be bought, and are clever enough salesmen to close the prospect who is interested.

It is time for the electrical dealer to forget "conditions" and begin to think about salesmanship and advertising. There are millions of people in the United States who have plenty of money and who are willing to spend it with the salesman who has enough ability to convince them that they need his merchandise. We needed a condition like the present to show the electrical merchants of this country that we must have better salesmen to handle our appliances, and now that it has arrived let us take advantage of it and let us put forth the effort necessary to train men to do the job as it should be done, to teach them to analyze each prospect, to know whether to talk saving in labor, time or money, and to know the conditions under which each prospect lives so that he will have a substantial foundation on which to base his sales arguments and be able to convince the customer by talking to her in her own language that she must have the appliance he is trying to sell to her.

There are hundreds of electrical stores who are doing a very satisfactory business today, and an analysis of the methods used by these stores shows one thing that stands out above everything else, and that one thing is that the salesmen employed by those stores are real salesmen who can sell goods regardless of "conditions." They merely prove that the United States today is full of business for the man who is a good enough salesman to get it.

TRADE DIRECTORY ISSUED.

The Chamber of Commerce of the State of New York, 65 Liberty street, New York City, has issued a 36-page booklet revised to July 1, containing a classified list of trade and allied associations and publications located in the city of New York, with an appendix of governmental offices, including municipal, county, state and Federal. Also the name, address and telephone number of consuls and agencies of foreign governments are given.

GOODWIN IS HONORED BY N. A. E. C. D.

During the afternoon session of the National Association of Electrical Contractors and Dealers, Wednesday, William L. Goodwin was about to address the convention when he was presented with a handsome leather-bound, inscribed, illuminated book containing the original signatures of all the members of the Association and an engrossed copy of the following resolution of appreciation:

"The National Association of Electrical Contractors and Dealers, assembled at Buffalo, N. Y., on this 20th day of July, in the year 1921, hereby makes record of its profound appreciation of WILLIAM LINCOLN GOODWIN as a man and leader of men; a man of courage and conviction; a man of vision and sincerity; a man lovable and just; a leader fearless and persevering; a leader aggressive and determined; a leader wise and resourceful. He has done more than any other man to put electrical retailing on a proper business basis and to promote harmony and co-operation throughout the entire industry. It is a privilege to have known him and we wish him Godspeed in his work."

Out of an annual economic waste of $2,000,000,000 it appears that 15% is due to defective illumination, or an economic loss of over $300,000,000 annually.

Discussing Sales of Electrical Goods to Women

Introduction of Technicalities Should Be Avoided When Selling Vacuum Cleaners, Washers and Other Appliances—Putting Forth Terms of Large Returns for Price in Saving of Time and Labor

By KATHRYN MADDOCK

"Spend your money so as to save money, getting back more than you spend."

There's wisdom for the buyer in this opening statement. Some purchases are actually investments, for they bring in returns which far exceed the purchase price. The housewife should be reminded of this when making her expenditures, particularly expenditures for electrical appliances, which are the kind of "buy" that repays the cost many times over in saving of time and labor, in greater comfort and convenience, and even improved health. The salesman should take advantage of this. Let him acquire a little acquaintance with household finance and he will be able to meet Mrs. Housewife on her own ground in this matter.

Don't Talk Motor Volume and Velocity.

Discuss the purchase of a cleaner with the customer in terms of the large returns which she will receive for the sum expended. Do not let her think of it merely as a case of parting with so many dollars, but concentrate her attention upon the benefits which she will receive.

To be sure, the man who deals in cleaners and washers is already pretty well burdened with housekeeping problems. He knows, or is assumed to know, a great deal more than the average housewife about washing the clothes, cooking the meals, cleaning the house, dishwashing and all the other home chores. He it is who is consulted for advice as to what kind of soap to use in the washer and how many times to rinse the clothes. He dispenses hints about how best to care for the parlor rug and he shows the housewife how to plan her week's duties so as to accomplish the most for the least expenditure of time and effort. He has supplanted Marian Harland and Mrs. Parloa as authority on the management of the home routine. He even puts on an apron and tries out his theories in actual practice. The wildest exponents of woman suffrage never conceived of a more thoroughly domesticated man than the electrical salesman has become!

In view of all this it may seem too bad to ask him to add one more home duty to his already onerous list, but it will really be worth his while to give a thought to the functions of the housewife as home purchasing agent and chief of the family exchequer. A rather considerable number of women are systematizing their accounts in budget form nowadays, and the majority of those who do not do so nevertheless recognize that it is the wisest plan. Women's clubs discuss this method of putting home finances on a business basis; it is taught in schools of home economics. Any woman will be pleased to have a salesman talk to her in terms of the "household budget."

The system of apportioning the home funds which has been worked out by Miss Sarah J. MacLeod, home economics specialist of the Society for Savings, Cleveland, and formerly of the U. S. Department of Agriculture, Washington, D. C., is simple and consistent and shows very clearly how much money is available at any time for purchases of electric labor-savers. According to this plan portions of the available income should be set aside for food, clothing, rent, operating expenses, advancement and savings.

Household Budget Plan Makes Appliance Purchases Easy.

The heading, "operating expenses," includes such essentials as light, heat, telephone service, soap, matches and similar materials, and the sum paid in wages for domestic service. Under "advancement" are classified all expenditures for household furnishing, for amusement, books and magazines, travel, education, gifts, club dues and a number of other items. Life insurance payments and investments come under "savings."

It is interesting to note that money for the purchase of electrical equipment may be drawn from all three of these funds. Miss MacLeod advises

women to use money which would otherwise go to servants for making the time payments on an electric cleaner or washer or some other labor-saver such as may do away with any necessity for a domestic. Part of the money allotted for "advancement" naturally is devoted to the same purpose since electrical equipment is a part of the "household furnishing." The housewife may or may not choose to take a portion of the fund set aside for savings to aid in these purchases but if she is sufficiently convinced of the rich returns which a cleaner, for example, will bring her, she may do this or at least she will increase the sums drawn from the domestic service fund and from the house furnishing fund for electrical purchases.

James L. Mahon, advertising manager of the P. A. Geier Co., makes this idea a particular hobby. "The purchase of a cleaner is in very truth an investment," he declares. "Money so spent is not gone in a twinkling; it is money which works for the housewife for years and pays dividends in health, comfort and pleasure. Present this side of the matter to her, while at the same time showing her the important place which this expenditure occupies in the household budget. Point out to her how much more the cleaner is worth to her than is the money she gives for it. In her home it has a value which can hardly be estimated and is certainly not to be measured in dollars and cents. If she were to put the $65 in a savings bank or into the purchase of some stock, at the end of 6 yrs.' time—a low estimate of the average term of service of a good cleaner—she would have merely the same amount of money, plus a slight sum of interest, a negligible matter when compared with the comfort and satisfaction which is hers through all those 6 yrs. if she chooses a cleaner instead."

Figures Show the Value of Investment in Electric Appliance.

If the life of the cleaner is 6 yrs., then its cost per year, if the initial expenditure for the machine and attachments was $65, allowing 6% interest per annum, is $14.73. This same cleaner accomplishes in about 3.5 hrs. each week, the same amount of cleaning which was done by the old method in 10 hrs.—and it does it much more thoroughly. In the course of a year the saving in time amounts to 347 hrs. If a maid were employed for this work she would receive at least $0.25 per hr., and the saving in her wages at this rate would be $86.75. If the housewife does the work herself, her time is of course much more valuable and the economy is proportionately greater. And not only is this large saving in actual cash to be balanced against the small sum of $14.73 paid for the use of the cleaner for the year, but there are also to be considered the added comfort, convenience and improved health for the housewife and increased length of service of the rugs. Under such circumstances, who can say that the buyer of the cleaner does not receive more than the value of the money spent when she makes this purchase?

"Show the woman that the cleaner is actually an investment," says Mr. Mahon, "rather than expatiating on the excellence of the motor and the volume and velocity of the air it moves. It is indeed true that spending is saving when the purchase of an electric labor-saver represents so great an economy for the housewife herself and for the home in general."

The salesman who is a real domestic science expert will include this argument in his sales curriculum for use on every appropriate occasion.

INSTALLING FIXTURES IN PUBLIC DINING ROOMS.

Contractor-Dealers May Find Profitable the Sale and Installation of Modern Illumination in Hotels, Restaurants and Clubs.

Wherever there is business there is a need for the services of the electrical contractor-dealer. And, particularly, there are opportunities for the electrical man wherever people assemble for entertainment or the satisfaction of their daily needs. The dining room of every hotel and every restaurant is a prospect; these places are not prospects

Typical Illustration of Fan and Lighting Installation in An Enid, Okla., Restaurant.

of the common type, the proprietor of which must be worked hard to sell, but, rather, they will buy of themselves if they find that there is a device, appliance or fixture that will add to the attractiveness of their establishment.

It is not to be assumed that the restaurant man is ready to toss his money away for anything that is offered. Most successful operators of such enterprises have worked up through a long period of trying times and know the value of their money. They also know the value of a charming dinner setting, and so are always ready to spend when shown what they want or need in the way of improvement.

The accompanying illustration shows how one dealer helped a restaurant manager in Enid, Okla., to add to the charm and beauty of his dining room. The fixtures shown and sold to the restaurant man are from the Williamson line, and represent a type finding quite popular favor in many such places. Almost every town has a number of restaurants that are badly in need of modernization, and each one of them represents a good prospect until such time as it is actually cared for.

You can afford to buy more trousers, and keep the shine off those you have, by going out after business instead of sitting at your desk.

Problem of Financing Electrical Contractor-Dealers

Discussion of Question Founded on Confidence in and Use of Great System of American Banking—Paper Before Convention of National Association of Electrical Contractors and Dealers

By ALFRED E. MARTIN

This is an electrical age; an age teeming with new and varied electrical labor-saving appliances. Each year we find new uses for electricity and new machines are invented for its application. Thus the field for electrical appliances and machinery is ever widening and becoming more remunerative. What was considered a luxury yesterday is deemed a necessity today.

Certain forces have been the dominant factors of various stages in the development of our civilization. In the early settlement of our country, when our forefathers were pioneers, the work and labor was performed by hand—mere man power. Physical prowess reigned supreme and sturdy manhood was the conquering force of that day. But this had its limitations and necessity compelled man to use his ingenuity and inventive genius to evolve machinery that could be propelled by horse power. Thus man gradually emerged from beneath his great burden. He shifted it from his own shoulders to that of brute force. The driving force of the world's work then was horse power.

Then came the age of steam which revolutionized the industrial world. It necessitated new machinery and appliances. It necessitated the erection of new factories for the manufacture of said machinery and appliances. It extended and increased our transportation facilities. It released the stored-up energy of nature, transformed and harnessed it for the use of man. It performed the world's work quicker, easier and more economically and gave man more time and opportunity for recreation and improvement. It was a long step from the age of man power to the use of steam. The world had made a great stride forward but the march of progress continued onward, for the electrical age was just beginning to dawn.

Each succeeding age brought with it great opportunity—and the electrical age is an age of great possibilities and potentialities. Electricity supplanted steam largely because it was more economical, convenient and satisfactory than steam. Just as the use of steam demanded new machinery and appliances, so does the use of electricity demand new devices for its use. Man foresaw this, erected his factories and is busily engaged today in the manufacture, distribution and sale of electrical supplies. Electrical engineering has become a popular and profitable profession. Every large university and industrial plant has its electrical department. Electrical power carries our messages of business, sympathy and love; transports our merchandise; drives our machinery, whirls our spindles; lights our homes, streets, factories, stores and mines and is the silent gigantic driving force of this busy work-a-day world.

Educating the Public to the Advantages of Electrical Appliances.

While electricity is used quite extensively, yet the general public needs to be more thoroughly educated to its use, especially in a domestic way. This is part of the task of the contractor-dealer. He must needs educate the buying public as to the advantages of electrical appliances. In this work he can and should receive the assistance of manufacturer and central station. He must carry on a campaign of education. The banks of this country carry on a campaign of education on the subject of thrift, primarily for the peoples' benefit but secondarily for the interest of the banks themselves. Just so with the electrical dealer. The demand must be created before there is a desire to acquire. This can only be done by education. It is not my mission and purpose to map you any campaign of education but merely to call attention to the necessity of such a campaign. The success or failure of the contractor-dealer depends upon this one thing. It is a vital element in the dealer's finances. He must move his wares, make frequent turnovers of the same, or he will soon find that he has a large investment in goods which are not moving and have become a non-liquid asset.

Importance of Proper Advertising.

While speaking upon the subject of educating the public, which is partly accomplished through advertising, let me point out what I deem is an expensive and unsatisfactory form of advertising. It has developed into one of the leaks of the contractor-dealer's business. This particular form of advertising is the prevailing custom of demonstrating electrical washers, mangles, sweepers and other electrical devices. For illustration, suppose A, B, C, D and E are contractor-dealers in your city and each of them handle a different make of electrical washer, and Mrs. Smith wishes to purchase a washer. She has each of these dealers demonstrate a washer in her home before she makes a purchase. There were five demonstrations and only one purchase. Each demonstration costs the dealer about $5 to $10, or a total aggregate cost of demonstration for the sale of one machine of $40. This expense must be included in the dealer's overhead and he must ultimately pass it on to the consumer.

The day will come and is not far distance when

the present plan of selling electrical washers and other appliances will be radically changed. Dealers in stoves, ranges, clover hullers and like machinery have long ceased to demonstrate their wares. The buying public must learn that the last word has been said in the perfection of these electrical devices and that there are a number of splendid machines on the market, any one of which will do satisfactory work. The contractor-dealer must cut out this unnecessary expense and change his form of advertising. We all recognize that advertising is a part of the expense of any business, but any business expenditures if wisely made ought to produce results.

Advantage to Contractor-Dealers of State and National Associations.

One of the best forms of advertising is through state and national associations. These associations are clearing houses of ideas. They are the sources of inspiration and enthusiasm. They give you the collective viewpoint of the contractor-dealer. These associations through their organizations, magazines, speakers and conventions emphasize the needs, the mistakes, the leaks and successes of the electrical business. They give one many suggestions concerning one's own particular business. These associations attract more than local attention. The state association and convention through the press advertises the electrical business locally, while the national associations and conventions through the same sources advertise nationally.

Every contractor-dealer should be a member both of his state and national association. Such a membership is very helpful to him in many ways and assists him in securing credit. Every delegate to this convention will carry away with him many valuable ideas. He will return to his individual task feeling "that it was good to have been here." No dealer can afford to stay beyond the pale of his associates. Trade associations unify and strengthen the dealer. It gives him standing with his banker. He no longer stands out alone—a single business man—but is a member of a large group of representative business men scattered throughout the state and nation. These men are all guided and influenced by the same principles and fundamental ideas.

These principles are termed the "Canon of Ethics" for the dealer. It emphasizes the fact that in every business transaction, there are three parties, viz: the dealer, the purchaser and the general public. It lays down other principles, as follows:

(1) That each member is engaged in an honorable vocation and that it is his duty to exalt its standard and extend its spirit of usefulness.

(2) That the member owes a duty and obligation to the general public as well as to himself.

(3) That every member should observe the rules and regulations safeguarding life and property and lend his assistance to public officials in the enforcement of the same.

(4) That as a member he will refrain from injuring the prospects, business and reputation of a fellow member and will submit all differences to a board of arbitration.

Mr. Dealer, have you a copy of this Canon of Ethics in your possession? Have you studied it and do you follow its teachings? If you do, it will redound not only to your financial success, but will make you a better citizen.

Code of Practice Developed for Guidance of Electrical Contractor.

The associations have developed a standard "Code of Practice" for the guidance of the contractor. This code includes 14 points, each of which will be very interesting to your banker, for he is interested in knowing how you arrive at the cost of a particular piece of work and is satisfied when you show him that the cost includes cost of material, of labor, of administrative and overhead expense of the contractor. He is interested in knowing that the contractor has a definite standard written contract and that it provides how the payments shall be made and that all differences are to be settled by arbitration.

These are some of the fruits of the electrical trade associations. The very fact that a contractor-dealer is a member of the state and national organizations adds dignity, stability and prestige to his business and also to his social standing in the community. Such a membership helps to establish better relations between the dealer and his banker, the jobber, wholesale house and manufacturer.

If you believe what I have said about the efficacy and benefits of the electrical associations, then, upon your return to your native heath, launch a vigorous campaign for membership in your state and national associations. By so doing you are underwriting the finances of your business.

Responsibilities of the Electrical Contractor-Dealer's Business.

I know nothing about the technique of your business, nor its mechanism, but every business has its financial phase. The average contractor-dealer is a graduate employe. He is usually long on the technical phases but short on the financial ones. Usually his general education is limited. His training has not fitted him to deal with discounts, credits, debits, finance, costs, charges, turnovers of both labor and goods, overhead expense and other kindred terms. Prior to his embarkation in business for himself, he has been guided, controlled and supervised by superiors. Now, he launches forth upon his own initiative. He leases a building, places his orders for a stock of merchandise, secures a few contracts and starts business upon his own responsibility.

Many men go into the contracting business without sufficient capital and continue upon that same basis—"a shoe string business." This is partly through ignorance—ignorant of the cost of starting and maintaining a business establishment, ignorant of what items constitute overhead. His lack of knowledge in figuring contracts and his eagerness to secure business ofttimes leads him to underbid the older concerns in order to secure the business, and the result is that he loses money on these contracts.

The contractor-dealer in order to be successful must master his business. This can only be accomplished through work, study and thought. Some one has said that the successful man must keep his eye upon the stars, his ear to the ground

and his nose to the grindstone. He must have a thorough and comprehensive knowledge of materials and their cost. He must be able to handle men and get the best results out of his employes. He must know that frequent turnovers in labor is unsatisfactory and expensive. He must know when to buy, where to buy, how much to buy and what to buy. He must know how to figure contracts, how much to add for overhead and the per cent of profit for the dealer.

Above all, he must be able to demonstrate to the wholesaler, the manufacturer, the jobber, the general public and his banker that he understands his business; that there is a legitimate field for his business and that he is a winner. Confidence in one's self and one's business begets confidence in others. The business man who can compel respect and admiration for his enterprise begets confidence and secures credit.

Necessity of Electrical Contractor Being a Business Man.

The electrical contractor is a business man—or should be—he must know his business so thoroughly that he can discover leaks, especially expensive ones, and stop them. Many a man's profit has been dissipated through undiscovered or neglected leaks. These leaks may be in advertising, transportation, labor turnover, injudicious buying, cost system or numerous other ways. It is a good idea occasionally for us to get the views about our own particular craft, vocation or profession from a business layman. We then not only have our own view of our business but we get the other fellow's view as well, and his criticisms, if constructive, are very helpful.

Whenever the contractor-dealer realizes that his business demands both brain as well as brawn and he needs to study the business side of his work as well as the material, manual and mechanical side of it, then he is ready to make progress. I have heretofore referred to the fact that the average contractor-dealer was not an educated man, and I say this with all kindness to the man whom circumstances has prevented from securing an education. But the average man can read, figure, plan, think and study. The trade journals, the conventions, associations and electrical articles and helps are all his for the asking.

We get in this country just what we want, if we want it hard enough. No man can sit down and read a trade journal, or attend a convention or association or listen to an able address and be the same man. Some word, suggestion or idea will start a train of thoughts, which culminates in some form of action. No delegate to this convention can go away from here without saying, "It was well to have been here."

Question of Finances in Relation to Retail Electrical Business.

Now what about the finances! How am I to finance my business? Let me ask you a question. What does it cost to run your business? Unless you know what your business is actually costing you are in no position to ask and reasonably expect credit. The man who sells you materials or lends you money will want to know and you should be prepared and willing to give him the desired information. He is entitled to it. If he has confidence enough in you to extend you credit you ought to have enough confidence in him to render a complete analysis of your business. But are you in a position to do so unless you keep a complete cost system such as is offered or suggested in your trade journals by your electrical and business experts? Your system of bookkeeping should be such that you can tell at the end of a fixed period:

(1) What your present inventory shows, what your previous inventory showed and whether there was a gain or loss during that period in your inventory.
(2) The extent, nature and character of your bills and accounts payable.
(3) The extent, nature and character of your bills and accounts receivable.
(4) The amount of merchandise, supplies and materials purchased.
(5) The various items of overhead, the per cent of profit; whether your receipts and expenditures are increasing or decreasing and which and how much; the volume of business transacted; what per cent of it was labor, materials, supplies, overhead, profit or loss.

Such a system is a check and balance upon your business. It will enable you to make out not only an intelligent financial statement but your income tax return as well. Up to the passage of the National Income and Excess-Profits Law thousands had but little if any system of bookkeeping. Their business was a hit or miss proposition. But that day is over. A new era has dawned in the business world and the man of the future must think out his plan and then work his plan.

American Banking Institutions and Their Mission of Helpfulness.

We all realize that for the past year we have been passing through an era of declining prices and credit and money deflation. There are always evidences of a business depression. We are on the downward grade and need to apply the brakes. Roger Babson, the business barometer of this country, says this nation is financially sound, but we need to exercise caution. Creditors' committees all over this country have their hold upon the safety valves of many a large concern. The credit man is the outstanding character and credits is the main topic in the commercial realm of today. Such an hour calls for brave hearts, men of wisdom, calm judgments and wise conservative action. Such a man is the American banker.

The banker has won nation-wide confidence. He serves by leading the bankers of all nations in quickly producing greater convenience for the public. He develops by constantly encouraging thousands of activities large and small, aiding the expansion and prosperity of countless communities. He protects by carefully guarding the funds in his care, with prompt provision against every preventable loss of any nature. It was the American banker who first sensed the passing of the peak in rising prices, money and credit inflation and credit is largely due him in preventing a financial crisis and a business panic. He is able to do this because he is an expert in finance, credit investments, markets, trend of prices and the causes and effects of the same. He is the business barometer of his community.

The mission of the bank primarily is the loaning and discounting of money and commercial paper; secondarily to render service to the gen-

eral public. Never before in the history of our nation have the banks performed more gratuitous service than they are rendering at this hour. The bank is your institution and the banker is your friend. Have you cultivated his acquaintance and his friendship, won his confidence and sought his advice and assistance? If not, resolve to do so in the near future.

Too many people look upon the bank and the banker as existing for the sole purpose of gathering in the shekels and doling them out miserly. This is a narrow and sordid view. The bank is more than the cashier. He is merely an employe of the bank. Back of him is the discount committee and back of them are the directors and back of them are the stockholders. Its money is not its own, but it is the aggregate savings of its stockholders and depositors. Bank officials must be conservative and judicious in loaning and discounting other peoples money. Its loans are made for the betterment of the community. A growing and expanding community presages a growing and expanding bank.

Your success or failure means success or failure to your bank. Your problems are its problems. Then let it help you solve your problems. It can do this with your co-operation and assistance. This co-operation and assistance should be continuous, helpful and encouraging, not intermittent and demoralizing.

Choosing a Bank and Taking the Banker Into Your Confidence.

Many people believe that one bank is as good as another and act accordingly by promiscuously patronizing different banks. This is a serious mistake. One should be as judicious in establishing his banking relationship as he is in choosing his fraternal order, or club, friends or social chums. In choosing a bank one should select an institution strong enough to accommodate the customers' needs; a growing and expanding institution that will beget growth, enthusiasm and initiative in its depositors; an institution that has service written large in its program of activities. Make that bank your financial home, get acquainted with the personnel of its employes, officers, customers and stockholders. Boost its stock and it will reciprocate by singing your praises. A bank's policy is to care for its customers. Many a stranger has been refused a loan by a financial institution in order to accommodate its own customers. When you have made your banking connections then establish your line of credit. In order to do this one must give his banker a financial statement.

Many people hesitate to give a financial statement to their banker. They hesitate to let others know about their finances. They want the bank to have confidence in them and loan them other peoples money, yet they do not have the confidence in the banker which they should have. They do not see the necessity of such a statement and object to what they term "red tape." The property statement furnishes the facts upon which the bank bases its judgment as to the creditor's standing and the amount of money it can safely loan the applicant. The property statement is recommended by the National Association of Credit Men as well as bankers and the reciprocal value of a signed statement is expressed in the following words: "Good credit in the markets of the world enables every merchant to add to his ability to do business. It gives him the use of enlarged capital, thus enabling him to carry a more complete stock, increase his sales and magnify his profits."

Large assets are not always necessary to the creation of credit; what is most desirable is, that credit be in relative proportion to the actual assets and in harmony with conditions which create and maintain it. A merchant's capital is the sum of his net available resources, plus his credit. The giver of credit is a contributor of capital, and becomes in a certain sense a partner of the debtor, and as such, has a perfect right to complete information of the debtor's condition at all times.

Credit is given a merchant because of the confidence reposed in him. Requesting a statement when credit is asked is not a reflection on one's character, honesty, or business ability, but is done to secure information to enable business to be conducted intelligently.

When a statement is made it should be absolutely correct. To make it so necessitates the taking of at least an annual inventory and the keeping of an accurate set of books. Statement giving, therefore, will tend to make a debtor a better buyer because more familiar with his stock; more careful in giving credit, more conservative in incurring debt, and will result in a better knowledge of his business generally.

The merchant who desires to serve his own interests should recognize that his most valuable possession, apart from his actual assets, is a sound, substantial and unquestioned reputation as a credit risk, and that, under the prevailing conditions and demands of business, the most effective and eminently the best way to prove his basis for credit is to be willing to submit a statement of his financial condition.

The property statement is but one source of credit information, however. There are other sources such as the local tax duplicates and assessors' schedules and the records of the county recorder's and clerk's office showing litigation, judgments, mortgages, conditional sales and other matter; the traveling salesman who frequently interviews the local banker; inquiries and questionnaires sent out by large mercantile houses with whom the contractor deals to local attorneys, bankers and others to be filled out and returned. The financier, whether banker, manufacturer, jobber or wholesaler is generally a wideawake fellow who usually keeps in touch with the doings of his particular locality. All this pertains to the establishing of credit and credit is the basis of finance.

Credit and the Factors Upon Which its Extension Is Based.

Credit oils the machinery of trade and keeps transactions moving smoothly and expeditiously. Perfect a country's credit system and remove the probability of a financial panic; strengthen a dealer's credit and prevent bankruptcy.

Daniel Webster says: "Credit is the vital air of modern commerce. It has done more, a thousand times, to enrich nations than all the mines of the world. It has excited labor, stimulated manufacturers, pushed commerce over

every sea, and brought every nation, every kingdom and every small tribe among the races of men to be known to all the rest; it has raised armies, equipped navies and, triumphing over the gross power of mere numbers, it has established national superiority on the foundation of intelligence, wealth, and well directed industry."

Credit is a medium of exchange and as such increases the working power of capital and makes it possible for commercial transactions to be carried on with much greater ease and freedom than when settlements are required in goods or money. That being true credit will increase the working power of the contractor-dealer's capital and lengthen his arm to reach out for enlarged business.

In determining the applicant's title to credit, the banker must take into consideration the borrower's ability to pay. This ability must be based on numerous factors. The careful lender before extending credit will always assure himself that the man asking for credit "knows his business"; that is, has the technical ability, an element entering into the finances of the business. Also that he has business ability, either native or acquired, or both.

Some one has said, "other things being equal, the person who possesses native ability has a distinct advantage over his less fortunate competitors. The keen-witted, able-minded, aggressive man is far more likely to succeed in business than the dull, slow-thinking and easy-going one." The experience of credit men is that there is an amazing amount of "dry-rot" in the management of business concerns. Shipshod methods and unprogressiveness are responsible for a large percentage of failures. One bank, in response to an inquiry concerning a local manufacturer replied, "It is an old mill operated by old machinery, carrying an old mortgage, turning out old-style goods in an old-fashioned manner."

Another factor of credit is character. The Morris Plan banks scattered all over the country have for their motto the following, "Character is the basis of credit." That is one basic factor in all credit, whether extended by banker or merchant. The credit-giver in sizing up the applicant will inquire whether he possesses honesty, good personal habits, diligence in business, frugality and punctuality. If he possesses these he is considered a "good moral risk." But character is not the only element considered. A good moral character goes a long way in obtaining credit and funds. The applicant's capital or assets is also carefully scrutinized. Financial strength, personal integrity and business ability determine success or failure. *Character, Capacity* and *Capital* are the three "C's" of credit.

An outward and direct evidence of financial ability in merchants is their promptness in meeting financial obligations. What are your payment habits? One of the greatest assets of a merchant is an untarnished credit reputation. Once impaired, it is very difficult to restore it. Injured credit has aptly been compared to "a broken piece of beautiful porcelain; you may put it together again and it may seem as good as of old, but the cracks are there and you cannot forget that it was broken." A wise dealer displays good financial ability when he distributes the maturing dates of his accounts and bills payable and does not permit his obligations to be bunched, but are so distributed throughout the year that he may meet them without serious embarrassment and employ his bank credit to the best advantage.

The wise business man cultivates a confidential relation with his banker. Owing to the banker's opportunity for studying the markets and industrial conditions and his great fund of information concerning financial, economical, industrial and business conditions, he is able to advise intelligently and can be of great assistance to his customer if he knows the facts concerning his customers business. Many a concern has been steered clear of financial breakers and kept out of bankruptcy through the advice, management and assistance of the banking interests of this country.

Avoid Financial Mistakes by Keeping in Close Touch With Your Banker.

Many a concern has been wrecked through financial mistakes which are preventable. Many a business man, when financially embarrassed keeps the matter a secret. He turns the key on his financial status and locks the true condition in his own breast and goes out weighted down with this crushing burden and tries to stem the tide of the onrushing flood of financial disaster alone. This is a serious mistake.

In the hour of disaster, seek the wisdom, foresight, courage and assistance of the houses with which you do business, your banker and those with whom you have business relations and "lay your cards on the table." Your interests are their interest, your failure injures them and your success is their success. The combined efforts of all concerned, if promptly enrolled, will save your business from a financial wreck. During the past year, numerous concerns throughout the United States have called together their mercantile and banking creditors and have sat around a table and unitedly have devised ways and means to save the business and pay the creditors' claims.

Another very serious mistake which many business men make is in neglecting to take care of their commercial paper. They execute a note and forget intentionally or unintentionally the date of its maturity. They pay no attention to notices that said note is long past due and let the instrument get into a collector's hands and into litigation, all of which injures one's credit standing. If not prepared to pay the note at maturity, arrange to renew it to such a time as you can pay it. Prompt attention to one's maturing obligations strengthens one's credit rating.

One's credit can be ruined by the pernicious habit of overdrafts. The banks will care for your overdraft occasionally but when it gets to be a habit, then the depositor loses prestige with his banking house and his business is not longer desired. He who continually circulates checks when he has not sufficient funds on deposit to pay them, deceives himself and his creditors and degenerates into an undesirable credit risk.

The credit man, whether of a commercial, manufacturing or financial institution, does not like chattel mortgages, sale and assignment of accounts receivable. There are times when these are justifiable, if done in order to tide over a critical situation. But when a business man is

compelled to resort to these practices his finances are in jeopardy and he needs immediate assistance. These are forerunners of receiverships and bankruptcy. These practices secure one or more creditors to the exclusion of all the rest and are unfair and unjust. It breeds distrust, contempt and leads to dishonesty. No man who engages in these practices is considered a good credit risk.

Some men get the idea that business is largely done on credit with little or no capital. That is a serious mistake. Credit only lengthens the arm of capital to take in a wider sweep and encompass a larger scope. These same men fall into the unpardonable habit of "kiting checks," of drawing against uncollected funds. No banker will tolerate such a practice. If his customer persists in so doing, he is politely requested to do business elsewhere. The business world looks askance at the fellow who passes checks when he has no funds to meet them, regardless of how much material assets he may possess. The banks refuse his business and he is known in the community as a financial outcast.

Some men can successfully manage small concerns, but cannot direct large enterprises. It is better to grow gradually than to enlarge too rapidly. The "get-rich-quick" idea has been many a man's downfall. Beware of the young lawyer who has a mania to form corporations, of the business counselor who has had no business experience and the stock promoter. The writer knew a successful business man who had built up a business, which was gradually enlarging, who fell into the hands of an attorney who formed corporations. This attorney persuaded him to incorporate, to expand and to get rich quick. A local bank inadvisedly loaned him the money to carry out this project. The business was incorporated, larger quarters were secured and improved; a large stock of merchandise was purchased and the overhead was trebled. In 3 yrs. the business was in bankruptcy and the bank and the other creditors received $0.50 on the dollar. The proprietor's life earnings and his credit were gone, simply because he knew how to manage a small business successfully but failed when tempted into wider fields.

Possibilities of Success or Failure in the Electrical Business.

The subjects of credit and finance are inexhaustible subjects. One can only touch on a few phases of either in a brief address or article and the writer does not bring you a panacea for all your financial ills. There have always been failures and successes in the business world and always will be. For some men are born long in certain lines and short in others. The electrical expert is likely to be a business failure. Not every man who knows the electrical business should be a contractor-dealer. Some men are naturally leaders; others, followers.

Remember that the personal equation is the larger part of every life and each individual must work out his own salvation. That virility, intelligence, courage and initiative when properly directed brings its own reward. That the future of the electrical business is what the contractor-dealer wills to make it. That the electrical appliances and machines will continue to multiply in number, character and variety. That the demand for these appliances, machines, accessories and supplies will increase many fold through proper advertising. That the general public will gradually awaken to the fact that these are necessities as labor saving machines. And insomuch as you as business men lighten the burdens of men, you are benefactors to the human race.

MODERN PIONEERS TO BE SERVED ELECTRICALLY ENROUTE.

New York Man Will Lead a Caravan of Automobiles to Far Northwest Completely Equipped With Portable Electrical Appliances.

While the days of the prairie schooner have passed and it is no longer necessary for a man, who would take the advice of Horace Greeley, to travel toward the setting sun with axe in one hand and rifle in the other, the pioneer spirit is not dead.

William B. Scott, a Brooklyn (N. Y.) business man, has organized a modern caravan of 600 pioneers who will shortly leave New York and travel by automobiles to Idaho, where they will take up reclaimed land now irrigated by tributaries of the Snake river.

Mr. Scott's caravan will be fully equipped with all modern devices to add to the comfort of the pioneers. Not only will there be portable electrical equipment provided during the journey west, but upon arrival in Idaho the home makers will find adequate provisions made so that they may utilize electric service in their homes and on their farms.

Learning of the proposed caravan, The Society for Electrical Development immediately wrote to Governor David W. Davis, of Idaho, suggesting that he use his good offices to encourage the public utilities of his state, particularly the light and power companies, to make necessary preparations to supply the settlers with electric power. That this matter has been adequately taken care of is evidenced by a letter received from the office of the Governor, as follows:

State of Idaho
Office of the Governor
Boise.

July 9, 1921.

Mr. C. Hill Griffith,
Director of Publicity,
The Society for Electrical Development, Inc.,
522 Fifth Avenue,
New York City, N. Y.

My dear Mr. Griffith:

Responding to your letter of June 28, may I say that estimates are being made now to carry electric power to the west end of Twin Falls where the Modern Caravan will settle. The matter has been taken up with the general manager of the Idaho Power Co. and power lines are not far from the tract.

Very truly yours,
(Signed) Frank W. Brown.

Electrical interests along the route are also making provisions to greet the pioneers and provide every modern facility which electricity has to offer during their stay in the different communities.

According to the U. S. Geological Survey electricity saves the nation about 41,000,000 tons of coal a year.

Resistors for Use With Various Types of Controllers

Metal, Carbon and Liquids Employed in Construction of Resistance Units—Ventilation Important in Equipment for Continous Duty — Standard Resistors Made in Various Sizes and Forms

By G. J. KIRKGASSER and E. W. SEEGER

Resistors of Many Styles.—Various kinds of resistors are used for standard lines of control apparatus. For small starters and regulators tinned iron or alloy wire, wound on asbestos tubes, is employed, the wire being exposed although the entire set of tubes are inclosed. One of these tubes is shown in Fig. 106. For certain purposes the resistance wire is mounted on spools or cores of molded insulating material, porcelain or other vitreous material, with the resistor later sheathed in an inclosure of baked cement to protect it against moisture and handling. Taps may be

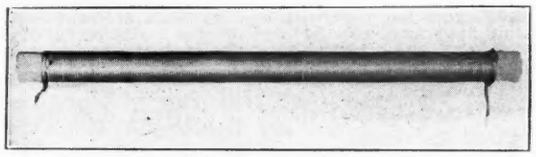


Fig. 106.
Iron wire asbestos-tube resistor.

brought out as shown in the illustration, Fig. 107, to divide up each unit into sections. A metal inclosing sleeve may also be employed to insure against breakage in cases where the controller may be subjected to extremely rough use.

To save space the resistor wire is often wound on flat cores, as shown in Fig. 111, and assembled for use with drum controllers, automatic starters and regulators of various kinds. Where the current carried is large in value the grid-type resistor only is capable of withstanding the service. The grids are usually mounted out of the way, and for this reason their bulkiness is not a disadvantage. For crane and hoist work in iron and steel plants grid resistors are used with practically all the large motors.

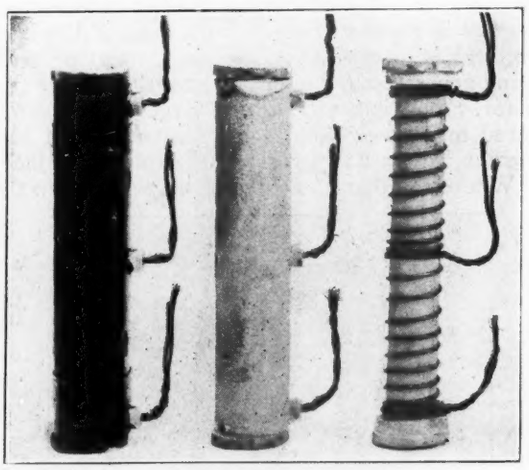


Fig. 107.
Round-type resistor, showing how the spool is wrapped with the wire, covered with a special cement, and protected by a metal sleeve. The method of bringing out taps is also shown.

Reflexed resistor wire imbedded in a cement or soapstone base is used in connection with many types of controllers for speed regulation and with generators for voltage regulation. This may be arranged in a circular plate form with a small handwheel, as in Fig. 116, or it may be mounted in an inclosing case. The latter is often a part of the speed-setting type of automatic machine tool

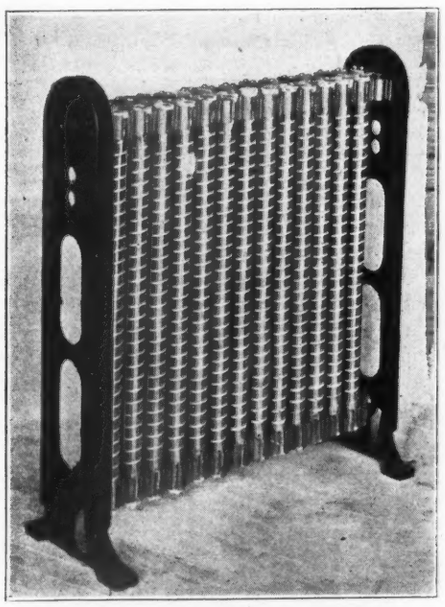


Fig. 108.
Tube resistor wound with flat ribbon.

controllers. The former may be used with a variety of starters and controllers, fine steps of resistor being possible to insure gradual speed changes. These are also used with generators for voltage regulation, and in the form shown in Fig. 117 to vary the brilliancy of lighting equipments of theaters, auditoriums, etc.

With one make of apparatus graphite-disc compression resistors are used. The high resistance of the column results from the loose contacts between the many discs inside an insulated inclosing tube. As pressure is applied the discs come in closer contact, offering less resistance to the flow of current. The terminal at one end is insulated

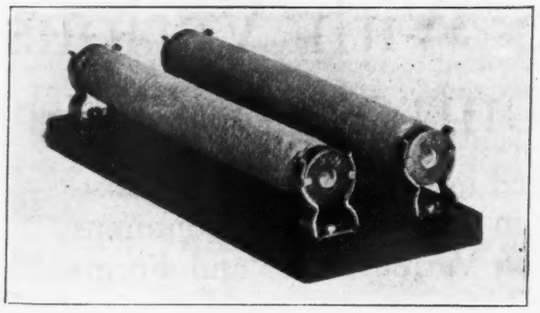


Fig. 109.

Resistor units, with baked cement inclosing sleeve, arranged for inserting in furl.

from the tube while at the other end the terminal is attached to a rod that slides in an insulated bushing. The illustration, Fig. 118, shows a cutaway view and also the component parts of a single compression resistor of this type.

Liquids are also used as resistors, and these have the advantage of a wide resistance range. Water in tanks is sometimes used for large equipments because of its capacity for absorbing heat.

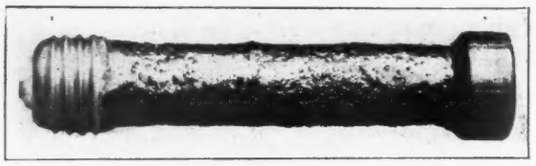


Fig. 110.

Resistor unit with Edison screw base and resistor material inclosed and imbedded in a cement coating.

The resistance of the liquid can be varied by changing its chemical properties, soda being used in connection with water rheostats.

When considerable moisture is present iron-wire resistors and grids must be protected, the iron wire particularly being subject to rusting which may lead to ultimate failure. Grid resistors are treated with a rust-resisting paint, the terminals being galvanized or sherardized.

The temperature coefficient of the resistance

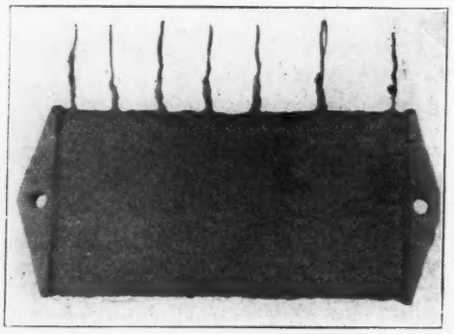


Fig. 111.

Flat-type resistor with baked-on cement.

material varies. Iron wire has a positive coefficient, which means that its resistance increases when its temperature increases. This is of little or no consequence in the usual starting-duty period of 10 to 15 or 25 to 30 sec. out of every 4 min. used as a basis for ordinary and heavy starting-duty service, respectively. Even where used for speed regulation duty with the resistor in continuous service sufficient capacity is provided so that the resistor does not become overheated, and the design takes into account the resistance value when warm.

Some alloys used as resistors have practically a zero temperature coefficient, so that regardless of variations in temperature the resistance value remains the same. This quality makes a resistor material desirable when employed in circuit with relays or coils of switches whose operation might

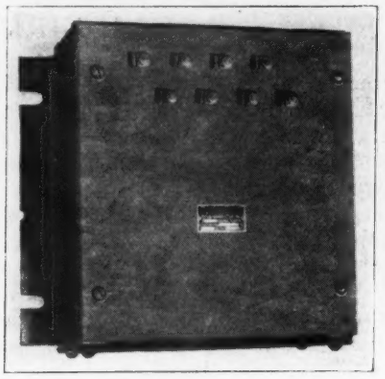


Fig. 112.

Resistance box used with various kinds of speed-regulating apparatus, usually containing a series of flat-type units with which connections are made by means of a lug shown on the slate panel.

be effected by variations in current due to increased resistance.

Some resistors of the alloy type and of the graphite type have slightly negative coefficients, their resistance decreasing somewhat with increased temperatures. When known and allowed for in the design the temperature coefficient does not materially effect results in the usual scope of controller design. When the resistor consists of a large weight of metal, compared to its radiating surface, the starting capacity is high because of the short time period. But the speed-regulating or continuous-duty capacity is low compared with resistors of the same weight, but with larger radiating surface.

In starting the effect is to raise the temperature of a certain weight of metal a given number of degrees in a given time. For continuous duty the problem is to dissipate a certain amount of heat being generated by the energy absorbed in the resistor. The ribbon grid has a large surface compared to its weight, while the cast-iron grid has greater weight compared to the exposed surface.

Where the thermometer can be placed directly

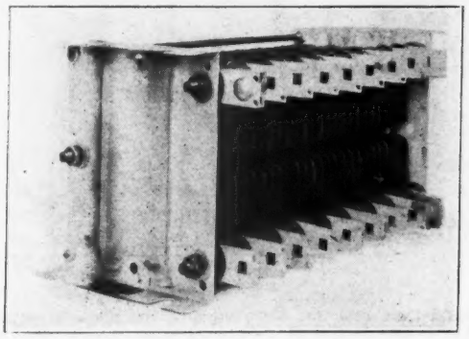


Fig. 113.

Grid-type resistor bank.

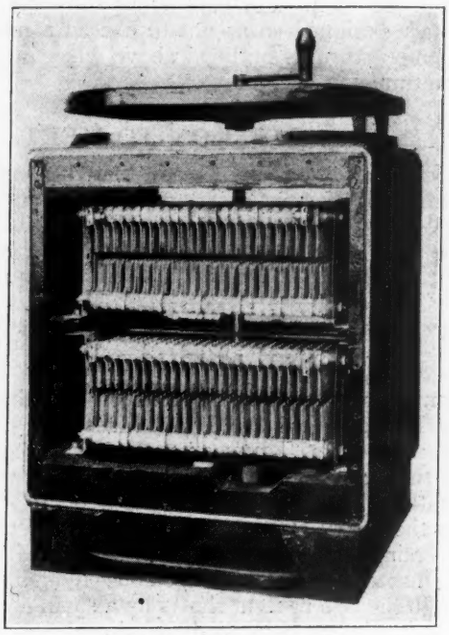


Fig. 114.

Grid-type resistors mounted in a waterproof inclosure as used on ships.

in contact with the resistive material, as with the iron-wire tube or the grid, the design of any controller should be such that the temperature rise recorded shall not exceed 350 deg. C. With resistors having the resistive conductor imbedded or entirely covered the thermometer cannot be placed against the conductor. In this case a temperature rise of 250 deg. C. is the accepted figure, the temperature being taken by holding the thermometer against the imbedding material. The standard set by the Electric Power Club for the temperature

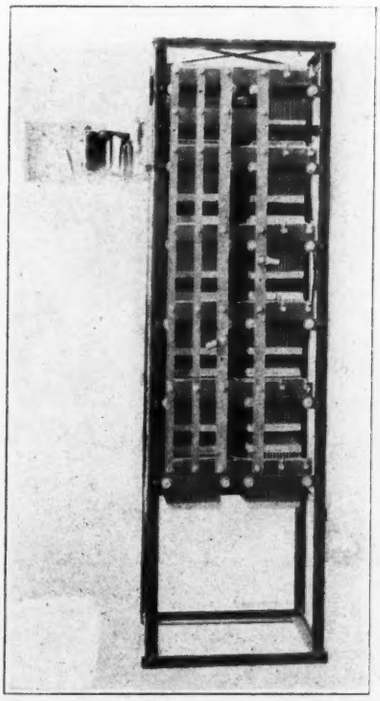


Fig. 115.

Grid-type resistor used on battery-charging equipment. This rear view shows the mounting between the slate front and the copper busbars in the rear.

rise for the air issuing from an inclosure carrying resistors is 175 deg. C. with the thermometer bulb held 1 in. from the inclosure.

Ventilation of Resistors Necessary.—The capacity of resistors may be increased by increasing the ventilation. Controllers usually have means provided for air currents to flow upward through the resistors, with liberal air spaces

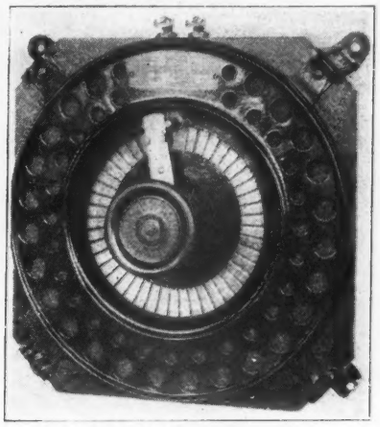


Fig. 116.

Resistor plate used to some extent for regulating the resistance in the field circuit of motors and for the voltage control of generators.

around the units in addition. Placing too many resistors in a small space gives no greater capacity than fewer resistors with more space. Hot spots develop and the life of the units is shortened where the resistors are crowded. If grids are stacked in deep banks the heat of the lower ones is added to the heat developed by the upper ones. Other resistors similarly arranged are likewise effected.

Grid resistors are placed close together in a frame where they are to be used for starting duty, since large thermal capacity is required. For continuous and speed-regulating intermittent duty they are spaced a little farther apart. Through the use of mica insulating washers between grids the grids are connected in circuit in parallel, while if the washers are omitted they become one resistor with the grids in series.

The radiating capacity of a wire-wound re-

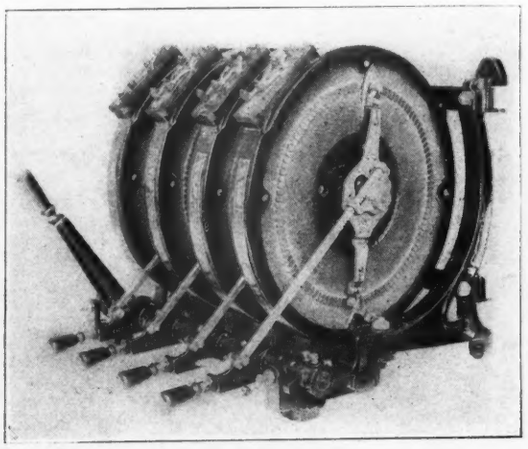


Fig. 117.

Reflex resistor wire imbedded in soapstone and cement-covered bases are used for regulation of the brilliancy of lamps—particularly in theaters—and are called dimmers.

sistor is increased when covered with baked-on cement, because the heat radiates from the larger surface of the cement. For light starting duty the standard design is for a resistor in circuit not more than 15 sec., starting once in every 4 min.

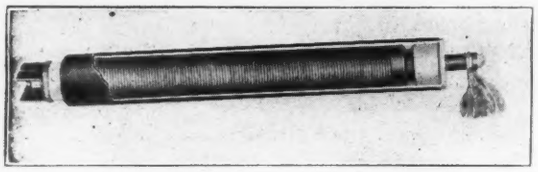


Fig. 118.
Compression-type resistor unit.

For heavy starting duty the resistors may be in circuit up to 30 sec., figured on a service of one start in every 4 min. This starting cycle—once in every 4 min.—is very seldom maintained except

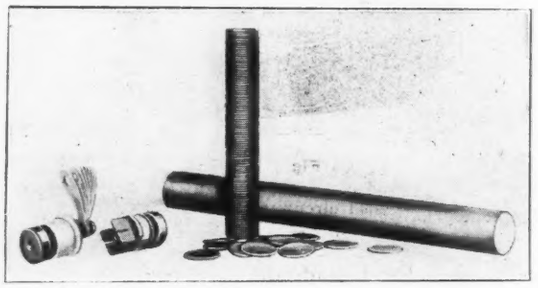


Fig. 119.
View showing the component parts of the graphite-disc compression-type resistor.

in some kinds of automatic control. The resistor design, therefore, for nine cases out of ten is particularly conservative.

Resistors for light intermittent speed-regulation duty are designed for a service of 1 min. out of every 4. For heavy intermittent duty the period is 2 min. out of 4. For continuous duty the resistors are designed so as not to exceed a maximum temperature as outlined above when in circuit continuously.

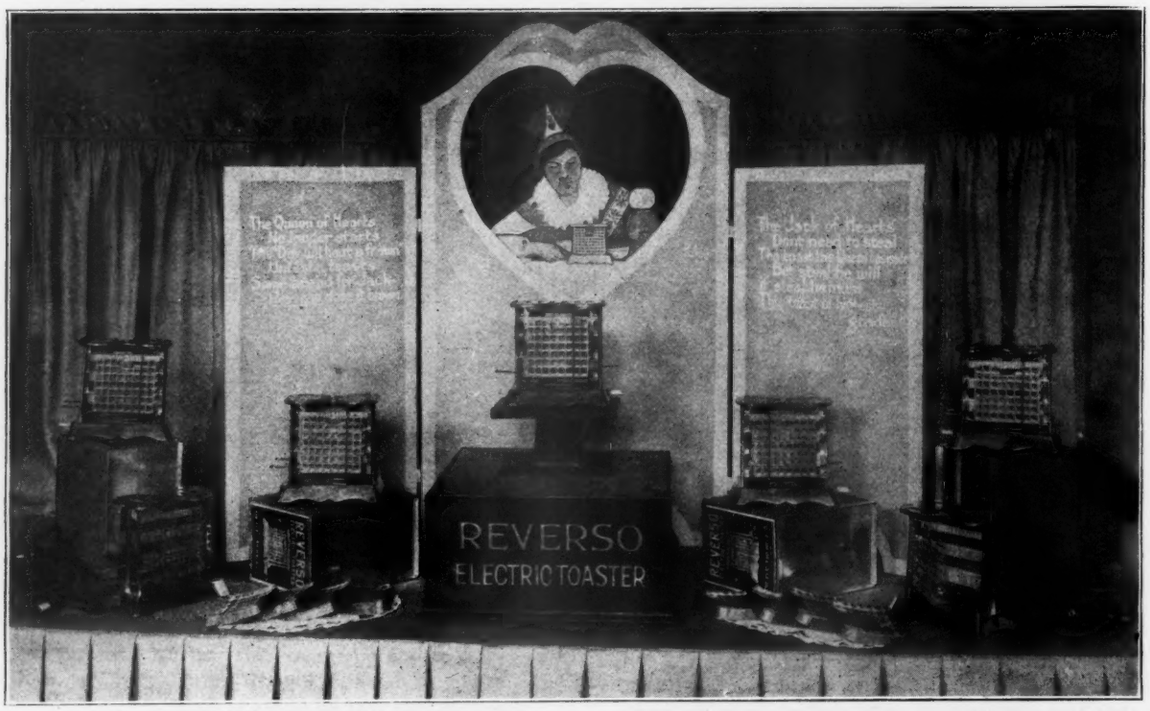
N. E. L. A. DIVISION TO MEET.

Announcement has been made that the annual convention of the Southeastern Geographic Division of the National Electric Light Association will be held Oct. 18-20 at Chattanooga, Tenn., with headquarters at the Signal Mountain Inn.

ELECTRIC TOASTER DISPLAYED BY NOVEL METHOD.

A unique window display has been brought out by the Electro Weld Co., Lynn, Mass., for properly displaying its "Reverso" toasters. Being an article that is essentially in motion as to its peculiar feature, it has been difficult to properly convey to the casual observer the fact and means of its reversing device. In this display this has been accomplished by a very ingenious motion imparted to the two upright shafts by a small motor, the shafts being concealed within an upright pedestal and at their upper end make connection with downwardly extending axes from the toaster on display, which is placed upon the pedestal. The motor by means of this mechanism imparts a well-timed movement to the slice holder so that it is intermittently, but constantly in motion, apparently reversing the toast from side to side.

The whole display is flanked by a screen in three sections, the theme of which is in itself attractive and novel. There is represented in the bright red background a modern "Queen of Hearts" preparing toast. On either side of the central section is a suitable inscription, not too commercial nor too literary, but with just enough of both qualities to appeal even if the moving feature of the exhibit were lacking.



Window Display Designed by Electric Weld Co. to Demonstrate Features of "Reverso" Electric Toaster.

Contractor-Dealers to Participate in Trade Congress

Program of Electrical Contractor-Dealers' Conference During National Congress of Retail Merchants to Be Held in Chicago in Connection With the Great Pageant of Progress Exposition

What promises to be the greatest industrial show Chicago has witnessed since the World's Columbian Exposition in 1893 is to be staged during the period from July 30 to August 14 at the Municipal Pier. It will be known as the Pageant of Progress Exposition and the wide publicity given to it in the past few months will bring thousands of visitors to the city.

For the purposes of the exposition the two great upper decks of the pier, each 2340 ft. long and 67 ft. wide, without a post to obstruct the view, have been divided into 17 general sections. Many inventions with which the public is not yet familiar will be shown by the electrical industries and the public utilities in Section V.

Arrangements have been made for a National Congress of Retail Merchants for Aug. 1-5 in the Red Room of the Hotel La Salle.

Of special interest to the electrical industry will be an "Electrical Contractor-Dealers' Conference" scheduled for Thursday and Friday, Aug. 4-5, under the direction of ELECTRICAL REVIEW, with C. A. Tupper as chairman. There will be morning and afternoon sessions, the former starting at 10 a. m. and the latter at 1:30 p. m. Such well-known speakers as W. L. Goodwin, general manager of the Society for Electrical Development; S. A. Chase, special representative of the Westinghouse Electric & Manufacturing Co.; W. H. Morton, general manager of the National Association of Electrical Contractors and Dealers; J. A. Corcoran, manager of the Commercial Merchandising Section of the General Electric Co.; Charles H. Mackintosh, president of the Associated Advertising Clubs of the World; E. W. Rockafellow, general supply sales manager of the Western Electric Co.; John W. Collins, secretary of the Electrical Contractors' Association of Chicago, and many others will address the conference on subjects of real moment to the electrical contractor-dealer.

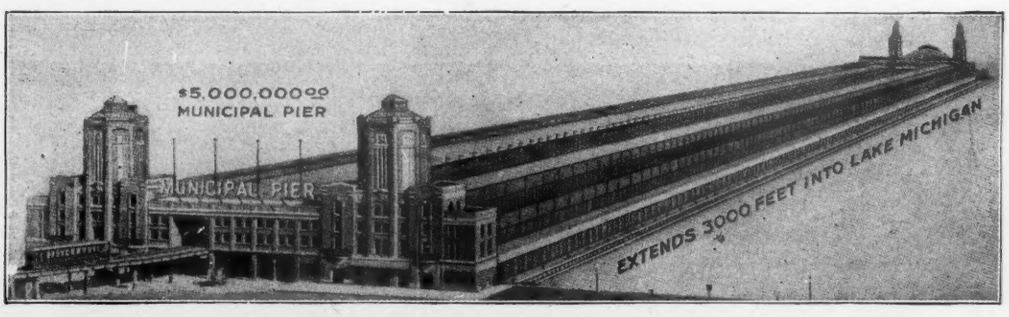
A cordial invitation is extended to every manufacturer, jobber and dealer to visit the Pageant of Progress Exposition and attend these big, helpful business-building meetings while in Chicago, and learn what the other fellow is doing and is going to do to build business this fall.

The National Congress of Retail Merchants is held during the first week of the Pageant of Progress, Aug. 1-5, at which time retail merchants from more than 20 states will participate. Advertising men and retail merchants of national prominence are on the program. The keynote of this 5-day event is "Business Building Plans and Ideas." All sessions will be held in the Red Room on the 19th floor of the Hotel LaSalle, high above the noise of street traffic and tempered by cool breezes. The various sessions of the Retail Congress are scheduled to take place as follows: Aug. 1, Business Builders' Conference; Aug. 2, Round Table; Aug. 3, Advertising Council and Retail Conference; Aug. 4-5, Electrical Contractor-Dealers' Conference.

It is in the latter meeting that the readers of ELECTRICAL REVIEW will be interested. The program for the Electrical Contractor-Dealer Conference is as follows:

Aug. 4, 10 *a. m.*—Addresses on "Merchandising Problems in the Electrical Industry," by Ainslie A. Gray, president, A. A. Gray Co., Chicago; "Economic Relationship of the Electrical Industry," by A. E. Clifford, secretary, Indiana State Association of Electrical Contractors and Dealers, Indianapolis; "Co-operation in the Electrical Industry," by William L. Goodwin, general manager, Society for Electrical Development, New York City; address by J. A. Corcoran, manager Commercial Merchandising Section of the General Electric Co., Schenectady, N. Y.

Aug. 4, 1:30 *p. m.*—Addresses on "Building Up a Business," by B. F. D. Allen, Allen Electric Co., Lexington, Ky.; "Ohm's Law Applied to Marketing Electrical Specialties," by Charles H. Mackintosh, president, Associated Advertising



Municipal Pier, Chicago, Where the Electrical Exhibits of the Pageant of Progress Will Be Found.

Clubs of the World, Chicago; "The Electrical Supply Jobber and His Relation to the Industry," by E. W. Rockafellow, general supply sales manager, Western Electric Co., New York City; "Our Problems in Ohio and How We Have Worked Them Out," by Claude L. Wall, chairman, Ohio Association of Electrical Contractors and Dealers, Akron, O.; "Does the Electrical Contractor Buy or Sell a Job?" by John W. Collins, secretary, Electrical Contractors' Association of Chicago.

Aug. 5, 10 *a. m.*—"The Contractor-Dealer's Opportunity," by William B. Eastwood, associate editor, ELECTRICAL REVIEW, Chicago; address by

Hotel LaSalle, Chicago, Where the National Retail Congress Will Assemble.

Samuel A. Chase, special representative, Westinghouse Electric & Manufacturing Co., New York City; "How the Jobber Can Help the Contractor-Dealer," by Howard Ehrlich, president, Electrical Trades Publishing Co., Chicago; "Getting Together for Team Work," by Frank B. White, Chicago.

Aug. 5, 1:30 *p. m.*—Addresses on "Marketing a Specialty," by Lathrop Collins, Kollins Kitchen-Kraft, Chicago; "The Washing Machine Market," by E. B. Seitz, secretary, American Washing Machine Manufacturers' Association, Chicago; "Merchandising Home Utilities in Chicago," by Col. F. G. Bolles, research editor, International Trade Press, Inc., Chicago; "What the National Association of Electrical Contractors and Dealers Has Done to Improve the Contractor's Opportunity as a Business Man," by W. H. Morton, general manager, National Association of Electrical Contractors and Dealers, New York City; "The Outlook in Outlets," by Ben Tousley, Electric Outlet Co., New York City; address by A. B. Harris, chairman, Indiana State Association of Electrical Contractors and Dealers, Gary, Ind.

Those who attend the Electrical Contractor-Dealer Conference at the Hotel LaSalle will have an unusual opportunity to attend the great exhibit of modern electrical machinery, equipment, devices and materials which will occupy a large section of the exposition upon the Municipal Pier. This electrical exhibit, while occupying only a section of the exposition, will contain the latest developments of the industry and compare favorably with the largest electrical shows ever held. The entire event of the Pageant of Progress is the most comprehensive of its kind held in Chicago since the World's Columbian Exposition in 1893.

The Retail Congress will afford the best opportunity to study business problems and methods of bringing about the much desired return to normal prosperity enjoyed by this country before the war. This will be a particularly good opportunity for electrical contractors and dealers to participate in the great reconstruction event that will redound to their benefit in future business. The greater the showing in attendance made by the contractor-dealer, the more important will the electrical appliance trade appear in comparison with the other branches of mercantile business—all of which will help in the future sale of electrical goods.

COPIES OF "THE GOODWIN PLAN" FOR DEALERS.

Nearly every contractor-dealer has heard of the "Goodwin Plan" first announced by William L. Goodwin in 1917 and later embodied in booklet form by Samuel Adams Chase and distributed throughout the electrical industry generally. Not all contractor-dealers, however, have received a copy of the booklet so they could study the simple but effective remedies for curing any ills of the business. There are still a number of copies of the booklet available and they may be had by addressing Samuel A. Chase, Special Representative, Westinghouse Electric & Manufacturing Co., 165 Broadway, New York City.

ELECTRIC DISHWASHER HYGIENIC.

Washing dishes by electricity is more hygienic than hand washing, according to a recent report of Surgeon James G. Cummings, U. S. Army. The report covers the effect of the influenza epidemic among an institutional population of over a quarter of a million people. It was found that where dishes are washed by hand there were 324 cases of influenza per 1000 persons. In other institutions, such as hotels and restaurants, where the work was done by electric dishwashers, the disease rate was only 108 per 1000. Electric dishwashing is more thorough and employs hotter water than the hand method, making it possible to sterilize the dishes perfectly.

Good electric lighting of a city or town brings increased business, greater civic pride, less crime and new industries.

National Convention of Electrical Contractor-Dealers

By D. V. WEED, Jr.
Eastern Editor, Electrical Review.

The National Executive Committee of the National Association of Electrical Contractors and Dealers opened its 21st annual convention at the Hotel Lafayette, Buffalo, Monday morning, July 18, with an attendance of almost 100%. The executive sessions occupied the first two days of the convention, the open sessions of the Association being held Wednesday and Thursday, with a final meeting of the Executive Committee on Saturday. This convention celebrated the 20th anniversary of the organization.

The first meeting of the Executive Committee was opened by President James R. Strong with a brief but pointed address, followed by the annual report of the secretary-treasurer, W. H. Morton. The report of the Central Stations Committee was then given by Chairman A. J. Hixon, and in the absence of Chairman A. Penn Denton of the Code Committee, his report was read by Secretary Morton. Through its chairman, A. L. Abbott, the Cost Data Committee gave details of the work it has undertaken, the progress made and the desire of the Committee to receive suggestions from the members of the Association.

On Monday afternoon the report of the Credit and Accounting Committee was given by Chairman J. E. Sweeney, who was followed by Chairman J. F. Buchanan with the report of the House Wiring Committee. The report of the Legislation Committee by Chairman E. C. Gramm was devoted largely to the recently proposed electrical ordinance for the city of Chicago, which was roundly condemned by the Executive Committee in a vote instructing Secretary Morton to send to the Chicago City Council a letter embodying the Association's disapproval of the ordinance and calling attention to the national harm its enactment would create by establishing a precedent for other municipalities to follow.

Other reports Monday afternoon were made for the Publication Committee by Chairman Paul H. Jaehnig, the Committee on the U. S. Chamber of Commerce by Chairman Robley S. Stearns, and the Universal Data and Sales Book Committee by J. A. Fowler. In connection with the latter report it was noted that, in the future, bulletin sheets will be issued as near as possible to Jan. 1 and July 1.

At the Tuesday morning session of the Executive Committee, J. A. Fowler, chairman of the Liability Insurance Committee, reported the progress made during the year and recommended that investigation be made of mutual indemnity insurance. The report of the Standard Symbols Committee, of which G. M. Sanborn, Indianapolis, is chairman, was read by Secretary Morton. The activities of the Labor Committee were given by Chairman L. K. Comstock, and after a description of labor conditions in some of the larger cities of the country had been given by various members, it was voted to continue the committee another year.

That the finances of the Association were well

Presiding over the 21st annual convention of the National Association of Electrical Contractors in Buffalo this year was James R. Strong, for the second time in its history serving as the Association's president. His previous service as president of the Association was 1905-1908.

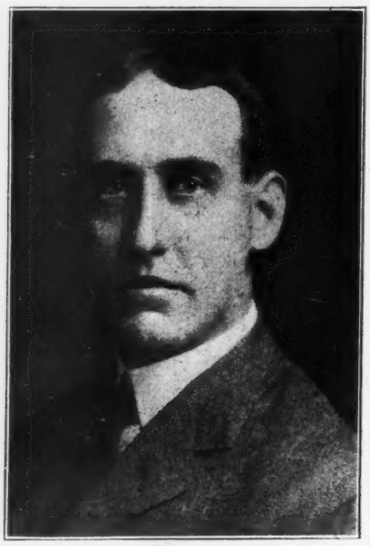
Mr. Strong is well known to most of the members, having been an active worker in the interests of the National Association since its formation. He was born in New York City Oct. 28, 1861. He has a pleasing personality and is thoroughly posted in matters pertaining to the industry.

Mr. Strong was graduated from Trinity College in 1882 and was first associated with the U. S. Electric Light Co., Newark, N. J., and later with the Watts-Campbell Co. For about 3 yrs. he was superintendent of the U. S. Illuminating Co. of New York, and since 1892 has been president of the Tucker Electrical Construction Co., one of the large electrical contracting concerns of New York City.

James R. Strong.

Mr. Strong is a member of the American Institute of Electrical Engineers, New York Electrical Society, New York Electrical Contractors' Association, president of the N. A. E. C. D. and chairman of the Board of Governors of the Building Trades Employers' Association. He is well worthy of all the honors and trusts bestowed upon him.

handled was shown in the report of Mr. Morton covering the period from Jan. 1 to June 30, 1921, which gave total receipts of $57,005.28 and expenditures of $49,596.05. The summary of the report gave a balance on hand to the credit of the Association of $16,152.52. It was shown that the Data and Sales Book had cost during the past 6 mo. of $1015.68 in excess of the receipts for its sale. As the book has been almost completely revised, the expense, it was pointed out, will probably not exceed this amount during the next 6 mo. It was also shown that the expenditure for the work of the Association's special representative was reduced by the sum of $387.73, that sum being the amount of expenses



W. H. Morton.
General Manager, National Association of Electrical Contractors and Dealers.

paid by one of the state organizations that took advantage of the offer made for special work in the state.

Despite business conditions the growth in membership in the National Association has maintained a steady increase. The membership June 30, this year, was 2320, as against 2184 the first of the year and 2071 on Sept. 1, 1920. This shows an increase since the last convention of 249, or 12%, and all members in arrears for the 1919 dues have been dropped. Of the 275 members dropped since Sept. 1, 1920, six have died, 25 went out of business, 88 resigned and 156 were for nonpayment of dues.

Report was made on a mail ballot, the results of which gave approval of the following resolution:

"That the Central Station Committee recommend to the National Association the passage of the following resolution by mail ballot:

"Resolved, That the Executive Committee of the National Association of Electrical Contractors and Dealers are opposed to the development by manufacturers of any detachable fixture device unless the same be fully interchangeable;

"Resolved, That this resolution be given publicity to all parties interested."

"The collection of data on the 'Cost of Doing Business' was carried out in the same manner as in 1920," said Secretary Morton in his comprehensive report, "except that the report form was somewhat simplified. We are still handicapped in the collection of information on this subject by the small number of reports received and the inaccuracies which occur in many of those submitted.

"On account of the latter condition I would recommend that the Executive Committee authorize the collection of this data for the ensuing year by signed rather than unsigned reports. If reports are signed we can then send those that are inaccurate back for correction, and it would seem that enough progress has been made in our industry to warrant the belief that members will submit signed reports willingly for the purpose desired.

"The collection of data by means of signed reports from 10 concerns has been started, but up to the time of making this report we have not received enough signed reports to start making up the figures. The usual data on wages, rate of charge for labor, inspection fees, etc., has been collected and published in the form of data sheets."

Two State Associations Hold Conventions in Buffalo.

Coincident with the National Association convention, both the New York State and the Pennsylvania State Associations of Electrical Contractors and Dealers held their annual conventions in Buffalo the past week.

With a dozen cities of the state represented, the Pennsylvania Association met in convention at the Hotel Lafayette, Buffalo, on the morning of July 19. Following the presentation of official reports it was decided, after mature discussion, to institute a registration system in Pennsylvania of responsible electrical contractors, or those engaged in the business who are experienced and equipped to perform such work, under a certificate plan with the aid of enabling acts covering fire prevention, health, etc., and thereby improve the standard of electrical construction work and installations.

The meeting of the New York State Association was also held in the Hotel Lafayette, Buffalo, on Tuesday. After the reading of the secretary's report there followed considerable discussion of the question of licensing electricians and the issuance of special electrical permits. There seemed to be a wide diversity of opinion on the subject, the members from the larger cities being opposed to such legislation, while the others appeared not to realize the possibility of harm materializing.

In a discussion on the subject of merchandising, the consensus of opinion was that the merchandising business in itself could not be made a paying proposition due to the limited margin of profit permissible, but conducted along with the wiring business of a contractor-dealer, it brought profitable returns.

Elsewhere in this issue of Electrical Review there appears the paper presented at the National Association convention by Alfred E. Martin, South Bend, Ind., on "Financing the Contractor-Dealer." Other instructive papers presented at this convention will appear in early issues of this publication.

EDITORIAL COMMENT

Removable Lighting Fixtures "Named"

Removable lighting fixtures are no longer "fixtures" in the sense of the Websterian definition of the term. They are now "elexiliers," and are so named when equipped with "elexits" which will permit their ready attachment or removal through the agency of a new standardized device which permits interchangeability of the lighting unit from one room or one house to another. Both terms are to be considered common nouns and should, in the course of time, find their way into the dictionaries and eventually become familiar terms to the public.

To insure the success of the new lighting equipment, 11 manufacturers of attachment plugs and receptacles have agreed to make and market a standard plug and receptacle for removable lighting units under the common word, "elexit." Thus, when an electric chandelier or electrolier is equipped with the type of plug known as an elexit, that lighting unit is an elexilier and is designed to be quickly attached to or removed from the type of receptacle known as an elexit.

Popularity of this type of lighting unit is still further assured through action taken by the National Association of Electrical Contractors and Dealers in a mail-ballot resolution opposing the development by manufacturers of any detachable fixture devices that are not fully interchangeable.

Here is an excellent opportunity for the contractor-dealer to create new business by the introduction of elexiliers and the installation of elexits for their reception.

Simplified Contract Estimating

Many central stations in the country are today willing to co-operate with contractors if the latter will do their part in making such a proposition feasible. In a number of cities the central stations are willing to pay the contractor for a job of wiring and collect from the consumer in installments which are added to the bills for the monthly consumption. In other cities the central station is willing to do the soliciting for new work and turn the contracts over to local contractors when the customer has been secured. To make the latter practice most feasible the central-station solicitor should be able to quote a price for a given job of wiring at the time the prospect is solicited. Where it is necessary to call in a contractor after the house owner is interested and have him estimate the job, and even then perhaps not be able to name a price upon the spot, there is danger of losing the prospect. This objection could be overcome if estimates were based upon some simple scale of prices so that the solicitor would be able to quote a price after inspection of the premises. Such scales of prices can be based upon a flat rate per outlet, flat rate per room and various other systems which are equally or nearly as simple.

Objection to this system is sometimes made by contractors for the reason that some houses will run above the average price, while others fall below it, and the contractor may consequently be involved in a loss upon certain particular jobs where the estimates are made upon such a basis. If, however, average prices are used in such an estimate, the contractor will gain as much upon those which fall below the average as he loses upon jobs which go above the average, and consequently in the course of a year should come out with the same margin of profit as if each job had been estimated with absolute accuracy upon its merits.

If the contractors in any town can agree among themselves upon such a scale of prices it will greatly facilitate solicitation by central-station salesmen and, while increasing the efficiency of the latter, will throw a large amount of additional business into the hands of the contractors. Many central stations are willing to follow out such a scheme of co-operation if the contractors show a disposition to carry out their end of the agreement.

Go After Business

Business conditions are still puzzling the experts as well as the plain business man. It is evident that the recovery of business for which everybody has been hoping since the depression began last year has not yet materialized. Yet there are no reasons for an attitude of constant pessimism. This country is basically all right. "Old clothes" are wearing out and new construction is demanded and means will be found to finance it.

A recent statement issued by the National City Bank of New York contains a timely and an authoritative review of present and near-future conditions. We present the following quotations:

"We know that our banking system is intrinsically sound, and that it has already proved its capability to withstand the shock of a period of extraordinary strain, and to emerge unscathed from the most difficult test

imposed in many years. We know that our ability, as a nation, to produce the raw materials which our people need, and which the world must buy from us, has been in no wise dwarfed. We know, finally, that our industrial and business organization is geared for production not only ample for our own needs, but on sufficiently large proportions to make export on a considerable scale a vital necessity.

"These are fundamental facts, so plain that they cannot be misinterpreted. It is hard to understand how, knowing the foundation upon which our business life rests to be as rigidly secure as it is, there can be any doubt as to the final recovery. It is progressing no more lagardly now than in 1903 and 1904, when we were passing through a somewhat similar period, or in 1907 and 1908. * * * *

"Although the process of bringing the price of farm products and manufactured articles into equilibrium must be slow and even painful, the fact does not mean that everyone can sit down, fold their hands, and wait for some mysterious set of forces to make things normal again. The result will come most quickly through the combined efforts of everyone, and the sooner every man and woman in this country who either receives wages or pays wages realizes and operates on the basis that the unbalanced state of industry as regards compensation received by important bodies of people must be overcome, the sooner will the real sound revival of business begin in earnest. It is important to *think* about the proposition, but it is utterly essential to *act* upon it."

The need of action is clearly indicated by this financial writer, and we believe he has struck the key-note of our future prosperity. Nothing excels industry, industry and more industry in times like the present. Do not sit in your office and expect patronage to come to you as it did in recent previous years—go out after it; and keep on going, and it will be found, often turning up in unlikely and unexpected places.

Planting a Business Saver

Occasionally an electrical contractor-dealer, in common with men in all classes of business, finds himself on the verge of bankruptcy. Because of various reasons which need not be defined, he has exhausted his credit, his contracts do not seem to produce the expected profit and he begins to feel like a drowning man without even a straw to grasp. If, at such a crisis, the contractor-dealer could find a trustworthy man of wisdom and experience who could step into the office of the electrical store, pick up the reins of business and drive the proprietor and his employes back to a safe road leading to prosperity, would the contractor-dealer accept the necessary condition of subordination through the period of his reconstruction?

Such a condition arose a few months ago in Chicago. A member of an association found himself about at the end of his resources. The secretary of that association learned of the member's difficulties. At about the same time the secretary received a visit from a man who was temporarily out of a position but who was well versed in the electrical business and in accounting. With a great deal of tact the secretary induced the distressed contractor-dealer to let him place the stranger in charge of the electrical business in the position of absolute manager. The stipulation was made that the contractor-dealer would assume the position of one of the employes in his own store, at a stated compensation, while the stranger directed all activities of merchandising and wiring for a period of 6 wks.

The new boss first established a simple but safe and satisfactory system of accounting and then began to place the contracting end of the business on a paying basis with, of course, the active and enthusiastic help of the owner, who, with renewed hope, greatly improved the installation work—through a system of adequate estimating of materials, labor, overhead and margin of profit. Frequently the manager called the original boss in from his work and took him carefully through the books and explained the various forms used for keeping accurate track of the business. Before the 6 wks. had passed the contractor-dealer had not only obtained a new outlook as to his business—a grasp of the essentials of accounting and estimating for profit—but he found his credit restored and, on the day the business was turned back into his hands, a substantial balance to his credit in the bank.

Illumination of Moving Picture Studios in England

Among the factors to be considered in the lighting equipment of the moving picture studio are the actinic values of the lights used, the cost of energy required to operate them, and the initial cost and cost of maintenance. In England the business of producing moving picture films has not been developed to so great an extent as in this country, but a few remarks concerning the difficulties experienced abroad in adequately and efficiently lighting the studios may, nevertheless, be of considerable interest.

The number of moving picture studios in England is comparatively small, and even the best of them appear to be lacking in a mobile system of illumination with flexibility and ease of control. The usual arrangement consists of a 3-sided stage with the two inclosing sides sloping outward and giving a greater width in front facing the operator than at the back. The lights are massed toward the front on both sides of the stage. These lights are usually supplemented by overhead units, and when necessary by concealed lights to illuminate the background. There appears still to be much room for improvement in the design and construction of special reflectors and shades, and also in the placing and ease of control of the various lighting units. A careful study of these matters should lead to a considerable reduction in energy consumption while

improving or at least maintaining the quality of the illumination.

The reflectors ordinarily used are not a'ways the best for the purpose, and much light may be thrown beyond the actual limits of the stage. Polished reflectors giving narrower beams, which may be lightly screened if necessary, have been suggested as a means of obtaining the desired reduction of intrinsic brilliancy without sacrifice of efficiency.

There appears to be no doubt that the modern use of "flooding" lights impairs to a certain extent the artistic qualities of the film-picture. The floodlights used tend to produce the concentration of light in an almost parallel beam, as in a searchlight, but it is probable that better results are obtainable by increasing the actinic value of the light rather than by intense concentration by relatively inefficient light. It is not suggested that covering illuminants giving a white light with blue tinted glass is a satisfactory solution of the problem because this procedure necessarily involves loss of efficiency. The aim of those working on the improvement of studio lighting should be rather along the lines of producing a source of light which shall itself emit radiation of the desired quality. It is well known to photographers that with a uniform white sky soft pictures are produced, and it is generally desirable to imitate as closely as possible this natural lighting in the studio. The not uncommon representation of interior scenes with a glare of light coming from overhead is not natural, and more attention should be paid to getting the greater part of the light from the direction of the windows, with a certain amount of reflection from the walls and ceiling of the room.

In a paper recently read before the Illuminating Engineering Society of Great Britain, J. C. Elvy refers to eyesight troubles in moving picture studios. The trouble which sometimes occurs results in irritation and inflammation similar to that which has been remarked in arc-welding and similar processes. Scorching of the skin is also a result of excessive exposure to ultraviolet light. Apart from the nature of the light it is very difficult, if not impossible, for artists to act naturally under the blinding glare of points of high intrinsic brilliancy. Mr. Elvy suggests that since all varieties of ultraviolet light are not equally injurious it would be useful to inquire and ascertain whether the rays which are chiefly needed from a photographic standpoint fall within the range of wave-length that is liable to cause eye trouble. The 220-volt arc appears to differ radically from the 110-volt inclosed arc. The former has generally been considered the best for commercial photographic work not involving color values. Tests appear to show that the inclosed arc is four times as powerful as the open arc using ordinary carbons, and it gives about twice as much photographic light as the open arc using white-flame carbons.

Development Costs

Investors in a new enterprise have to be satisfied, as a rule, with meager returns while the business is being built up. In a business subject only to the natural laws of trade they expect to make up for the early lean years by large profits later. In a business classified among public callings the rate-making powers must allow for the losses during the lean years, or their rate will be confiscatory and, of course, will drive investors from the field. In the former class the value of the established business is a part of the "good will" and may be determined by consideration of the profits for a number of years, or exchange value may be considered. In the latter case a different rule must be adopted. If a deficiency in the fair return in the early years was due to losses or expenditures which were reasonably necessary and proper in developing efficiency and economy of operation and in establishing a business it should be made up by the returns in later years. If there was a fair return from the start the corporation has received all it was entitled to, irrespective of how much of the earnings may have been diverted to the building up of the business.

To view the matter in another aspect, take the case of a public service corporation with a plant constructed just ready to serve the public. It is going to take time and cost money to develop the highest efficiency of the plant and to establish the business. Three courses seem to be open with respect to rate making, viz.: (1) To charge rates from the start sufficient to make a fair return to the investor and to pay the development expenses from earnings—a course likely to result in prohibitive rates except under rare and favorable circumstances; (2) to treat the development expenses as a loss to be recouped out of earnings, but to be spread over a number of years—in other words, as a debt to be amortized, and (3) to treat the development expenses, whether paid from earnings or not, as a part of the capital account for the purpose of fixing the charge to the public. The last course would seem to be fairest both to the public and the company, as well as being the most practical.

Electric, telephone, gas and electric-railway rates stand today second only to the 2-ct. postage stamp as the cheapest of all commodities purchasable, whether food, fuel, clothing, luxuries, or housing.

THE WEEK'S NEWS

Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests

ILLUMINATING GLASSWARE GUILD SHOWS PROGRESS.

Development of Industrial Lighting and Proposed Standardization Work Among Subjects Discussed at Philadelphia Meeting.

The July quarterly meeting of the Illuminating Glassware Guild was held July 15-16 at the Ritz-Carlton hotel, Philadelphia, and the members in attendance were satisfied that progress was being made in working out their new organization plans. The Guild sessions started with a get-together luncheon for all members, although this luncheon was preceded by a meeting of the Board of Governors. Immediately at the conclusion of this luncheon the general meeting was called to order by President Blumenauer. The first general discussion covered conditions in the industry as seen by the individual members, each man present being called upon to discuss briefly the present conditions and the outlook for the future. The sentiments expressed were all optimistic, although due recognition was given to the fact that there were numerous problems and difficulties in the industry yet to be surmounted.

The Committee on Design, appointed at the last meeting, reported that a start had been made in its proposed standardization work and also on a plan for registration of designs to prevent unnecessary duplication of moulds by the various manufacturers, thereby protecting originality of design.

The Committee on Merchandising, which held a meeting recently at Pittsburgh, reported success in securing the editorial co-operation of the trade press in publication of educational articles on illuminating glassware. The first of these articles by F. J. Blaschke, Ivanhoe-Regent Works of General Electric Co., was exhibited at the meeting. This article entitled "Glass an Adaptable Element in Lighting Equipment" was published in the July 9 issue of ELECTRICAL REVIEW. Further articles have been arranged for to appear later and the Merchandising Committee has secured the hearty co-operation of the manufacturers of lamps—the fundamental source of the light suitably utilized by means of illuminating glassware. Other aspects of the merchandising problem were discussed freely, and E. Y. Davidson, Jr., illuminating engineer of the Macbeth-Evans Glass Co., gave a very instructive talk on the development of industrial lighting and the important functions of illuminating glassware in its proper development.

The Saturday morning session opened with a report of the progress made to date in developing the uniform cost system and the procedure to be followed in the immediate future. Trade statistics and charts showing the condition of the illuminating glassware industry as indicated by statistical reports compiled to date were presented to the meeting by Business Manager C. R. Stevenson and his assistant, C. H. Ferris. Some general comparisons were made with conditions in other industries. Plans were also discussed for a system of informative reports on new orders and contracts for the benefit of the individual sales departments.

There was considerable regret expressed that W. F. Minor, vice-president, was prevented from attending by illness. His work as chairman of the Merchandising Committee is proving remarkably successful and the other members had hoped to learn more about his plans from him personally.

Summing up, the spirit of this meeting may be expressed in the idea of promoting better lighting with the marketing of illuminating glassware as a secondary consideration.

Among those present at the meeting were: F. D. Gill and C. A. Gill, Gill Glass Co., Inc., Philadelphia; E. B. Gillinder, Gillinder Bros., Port Jervis, N. Y.; H. L. Lissfelt, Macbeth-Evans Glass Co., New York office; P. W. Jenkins and E. Y. Davidson, Jr., Macbeth-Evans Glass Co., Pittsburgh; H. J. Tait, Ivanhoe-Regent Works of General Electric Co., Monaca, Pa.; E. H. Peck, Phoenix Glass Co., New York City; T. H. Howard, Phoenix Glass Co., Monaca, Pa.; I. J. Collins, Hocking Glass Co., Lancaster, O.; Garrett Bryce, U. S. Glass Co., Pittsburgh; M. O. Taylor, H. Northwood Co., Wheeling, W. Va.; C. H. Blumenauer and M. O. Griffith, Jefferson Glass Co., Follansbee, W. Va.; M. Sargeant, Consolidated Lamp & Glass Co., Pittsburgh; J. Beiswanger, Gill Bros. Co., Steubenville, O.; C. R. Stevenson, C. H. Ferris and W. N. Guthrie, Stevenson Corp., New York City.

REVIEW OF BUSINESS CONDITIONS BY NATIONAL CHAMBER.

Instead of waiting for some mysterious set of forces to restore good times, the people of the United States have settled down to the grim and sober business of working out their own salvation, writes Archer Wall Douglas, chairman of the Committee on Statistics and Standards of the Chamber of Commerce of the United States, in his monthly review of business conditions in the current number of *The Nation's Business*. While the return to better times is certain to be slow, he says, there can be no doubt as to the final recovery.

"The story of the present business depression," says Mr. Douglas, "is very similar to other depressions which have occurred during the past half century. The beginning of the end of speculation and over-expansion came with restriction of credit that put a sudden crimp in the volume of business and started prices downward on their long journey of declines. Then followed the slowing down in industry, the incubus of much

unemployment, and all the attendant evils of hard times. After the first shock there was a flood of forecasts of an early return to former conditions and the passing of those ills which afflicted the country. Invariably the prophecies came to grief. One of the remarks of past depressions was the fantastic schemes advanced to prevent the return of such eras. These schemes included the stabilization of prices and doing something to the currency so that its purchasing power would always be the same. And there are those among us who take these theories seriously today just as our forebears did in their day. We have at least one consolation in this generation, that out of the welter of past misfortunes we have learned the lesson of a sound financial system as embodied in the Federal Reserve Bank."

NEW OFFICERS OF PACIFIC COAST DIVISION, N. E. L. A.

The following officers were elected at the recent convention of the Pacific Coast Geographic Division of the National Electric Light Association: President, A. B. West, Southern Sierras Power Co., Riverside, Cal.; first vice-president, J. B. Black, commercial manager of the Great Western Power Co., San Francisco; junior vice-president, L. M. Klauber, San Diego (Cal.) Consolidated Gas & Electric Co.; treasurer, Henry Bostwick, manager of the Pacific Gas & Electric Co., San Francisco.

The new executive committee will consist of A. Emory Wishon, San Joaquin Light & Power Corp., Fresno, Cal.; George Campbell, manager of the Truckee River General Electric Co., Reno, Nev.; William Baurhyte, Los Angeles Gas & Electric Co.; S. M. Kennedy, Southern California Edison Co., Los Angeles; William Shepard, commercial manager of the California-Oregon Power Co., San Francisco; Glen E. Arbogast, F. E. Newbery Co., Los Angeles; R. M. Holterman, Fobes Supply Co., San Francisco; Percy H. Booth, Edison Electric Supply Co., Ontario, Cal., and R. S. Masson, Arizona Power Co., Phoeniz, Ariz.

OHIO ELECTRIC LIGHT MEN ELECT OFFICERS.

At the closing session of the convention of the Ohio Electric Light Association held at Cedar Point, O., last week, the following officers were elected for the ensuing year: President, W. A. Wolls, Columbus, O.; vice-president, E. L. Franklin, Warren, O., and secretary-treasurer, D. L. Gaskill, Greenville, O.

This year's convention was well attended and many interesting and instructive papers were read, some of which will be printed in early issues of ELECTRICAL REVIEW.

PUEBLO FLOOD AND A CARLOAD OF ELECTRIC RANGES.

An interesting event in connection with the recent flood which visited Pueblo, Colo., is reported by L. D. Smith, of the Standard Electric Stove Co., Toledo, O., which had the misfortune of having a carload of "Standard" electric ranges reach Pueblo just about the time of the cloudburst. It appears that this consignment of electric stoves, amounting to $10,231.24, was destined to Barker Bros., Los Angeles, but naturally failed to reach its destination. The shipment has been partially salvaged, but neither the Standard Electric Stove Co., the railroad, nor Barker Bros. claim salvage, and disposition of the shipment is now being debated by legal counsel for the railroad and the Standard Electric Stove Co. Both claim the cloudburst was an "act of God" and disclaim responsibility.

The shipment was sent f. o. b. Los Angeles, the shipping date from Toledo being May 28, and the Standard Electric Stove Co. feels that it was therefore in the care of the railroad until it reached its destination and that they should be responsible.

WIRELESS STATION AT MARACAIBO COMPLETED.

The erection of the towers for the new wireless station at Maracaibo has been completed and the apparatus has been installed. The station is equipped with a 5-kw. set with a rotary synchronous spark system. The towers are 50 m. high and the normal sending radius by day will be about 800 mi. and by night about 1600 mi.

The Venezuelan Government has already definitely arranged for seven additional wireless stations to be situated at Maracay, Caracas, Puerto Cabello, La Guaira, San Cristobal, Ciudad Bolivar, and Margarita Island. Some of these stations have already been installed by the American who holds the contract covering all the installations. After all of the above-mentioned stations are completed there are to be 16 additional stations installed to provide service for the capital of every state in Venezuela.

N. E. L. A. COMMITTEE REPORTS TO BE PUBLISHED.

By authority of the National Executive Committee copies of the Overhead Systems Committee report and of the Prime Movers Committee report, which were presented at the 44th convention of the National Electric Light Association, will be published by the Association and made available to members. The price to members of the Overhead Systems Committee report will be $2 and of the Prime Movers Committee report $3.50 per copy. Nonmembers will be able to purchase copies of these reports at a price of $4 for the Overhead Systems Committee report and $7 for the Prime Movers.

CHINA AWAKE TO VALUE OF ELECTRIC POWER.

Up to only a few years ago artificial light in China for the purpose of illumination was supplied by the use of candles and oil lamps. The glow of electric incandescence has since penetrated all parts of the country and today there are electric light plants helping to dissipate the mist of night in at least 200 cities in the 18 provinces of China proper. These plants are being taxed beyond their capacity and are in need of additional equipment, for the Chinese people are awake to the great value and con-

venience of electric power. Manufacturers of electrical goods will do well to give more thought and attention to the Chinese market for their products.

The model city of Nantungchow, in Kiangsu province, is to install a new electric power plant whose equipment, being purchased in America and in Europe, will cost about $500,000. It is reported that the new plant will be ready to supply power in January, 1922.

NEW 9000 KV-A. HYDRAULIC UNIT FOR COHOES PLANT.

The Cohoes Power and Light Corp., Cohoes, N. Y., one of the oldest organizations for the development of hydraulic power in the United States, is making substantial additions to its power plant on the Mohawk river, and has recently received a new 9000-kv-a. vertical General Electric waterwheel generator which will make a total of four installed. The present plant, which is a consolidation of several small installations, was built and put into operation with three generators in 1915. These machines were rated at 9000 kv-a., 185 r.p.m., 12,000 volts, and 40 cycles, giving the plant an initial capacity of 30,000 hp. The ultimate capacity is expected to be 50,000 hp., of which 40,000 hp. is provided for by the addition of the new machine.

The new generator is of the 3-phase revolving-field type. The armature winding consists of form-wound barrel-type coils, all of which are interchangeable. Windings are *Y*-connected, and temperature coils are installed in them. The rotor spider is made up of one solid steel casting with pole pieces dovetailed into the main spider, the whole rotor being designed to withstand 80% over speed with an ample factor of safety. The fly-wheel effect of the rotor is 1,700,000 lb. ft. The entire weight of the turbine runner, hydraulic thrust and generator rotor is carried on a General Electric spring thrust bearing.

A 250-kw. direct-connected exciter, which is capable of furnishing excitation for three 9000 kv-a. machines if necessary, is supplied for the new unit.

UTILITY REDUCES WAGES.

Effective July 15, the Consolidated Gas, Electric Light & Power Co., Baltimore, has reduced the wages of all officers, department heads and other employes, all sharing alike on a percentage basis. A total of 2890 persons are affected, with net estimated saving to the company of $200,000 during the coming 6 mo. The annual payroll aggregates $4,000,000.

UTILITY COMPANY SUSTAINED IN REFUSING SERVICE.

The Board of Public Utility Commissioners of New Jersey has sustained the refusal of the Public Service Electric Co. to furnish electric energy to the Electric Conduit Co., Plainfield, N. J. The first noted company, in admitting its refusal, justified the action by the fact that the installation of the Conduit company did not conform to the reasonable rules prescribed under its regulations. The petitioner contended that such rules were unreasonable, requiring the use of a special safety cabinet, and were, in effect, "closed" specifications. In its decision the Commission says that the evidence does not bear out this contention, nor is it shown that the specifications complained of prevent the Conduit company from securing equipment in the open market which will meet the requirements of the electric company.

DUTCH OVENS INSTALLED FOR USE OF MILL REFUSE.

The North Coast Power Co., Portland, Ore., is equipping its steam-electric power plant at Chehalis, Wash., for burning mill refuse instead of local lignite. This plant is equipped with two 750-kw. turbogenerators for which steam is supplied by three Stirling boilers. The station is also connected with a hydroelectric unit that furnishes energy for a part of the load.

At the boiler plant three steel Dutch ovens are to be installed, each 11 ft. wide and 11 ft. long, for mill refuse fuel. Each oven is an enlargement of the firebox for feeding the refuse, leaving undisturbed the arrangement for hand-firing with coal. The change involves the installation of hog-fuel bunkers above the boilers and a system of Jeffrey wire-rope conveyors and elevators by which the refuse will be raised to the bunkers from stock piles. The mill refuse will be furnished by local sawmills and delivered to the plant in railroad cars.

COMING CONVENTIONS.

Pageant of Progress Exposition, Municipal Pier, Chicago, July 30-Aug. 14.

Michigan Electric Light Association. Annual convention, Ottawa Beach, Mich., Aug. 24-25. Headquarters, Hotel Ottawa. Secretary, Herbert Silvester, Ann Arbor, Mich.

New England Geographic Division of the National Electric Light Association. Annual convention, New London, Conn., Sept. 6-9. Headquarters, Hotel Griswold. Secretary, Miss O. A. Bursiel, 149 Tremont street, Boston.

Great Lakes Geographic Division of the National Electric Light Association. Annual convention, French Lick Springs, Ind., Sept. 14-16. Secretary, R. V. Prather, 305 De Witt Smith building, Springfield, Ill.

Indiana Electric Light Association. Annual convention, French Lick Springs, Ind., Sept. 14-16.

Association of Iron and Steel Electrical Engineers. Fifteenth annual convention, Chicago, Sept. 19-24. Headquarters, Hotel La Salle. Secretary, John F. Kelly, Empire building, Pittsburgh.

Illuminating Engineering Society. Annual convention, Rochester, N. Y., Sept. 26-30. General secretary, Clarence L. Law, 29 West 39th street, New York City.

American Electrochemical Society. Meeting at Lake Placid Club, N. Y., Sept. 29-Oct. 1.

New York Electrical Show, 71st Regiment Armory, Park avenue and 34th street, New York City, Sept. 28-Oct. 8. General manager, George F. Parker, 124 West 42d street, New York City.

Cleveland Section of the American Society of Mechanical Engineers. Great Lakes regional meeting, Cleveland, Oct. 3-4. James Guthrie, Fidelity building, Cleveland.

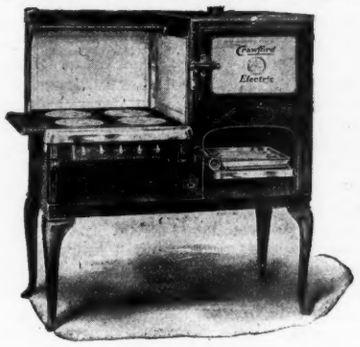
Southeastern Geographic Division of the National Electric Light Association. Annual convention, Chattanooga, Tenn., Oct. 18-20. Headquarters, Signal Mountain Inn. Secretary, Charles A. Collier, Electric and Gas building, Atlanta, Ga.

APPLIANCES and DEVELOPMENTS

New, Improved or Interesting Electrical and Mechanical Apparatus and Devices, and Applications of Equipment and Methods in Practice

Crawford Electric Range With Adjustable Broiler.

Just as the coal stove instituted a marvelous improvement over the early brick oven, and the gas range paved the way for a new era of cooking convenience, so has the electric range brought to the housewife a cooking device so simple and economical in its operation, so easily controlled, so perfect in its cooking results and so attractive in appearance as to remove from every-day food preparation the uncertainties and discomforts hitherto



Crawford Electric Range.

experienced before the electric range had been perfected. The electric range eliminates soot, flame, gases and excessive heat. By simply turning a switch the oven and surface heaters are brought to a maximum temperature, which may promptly be reduced one-half or three-fourths by another turn of the switches.

The above statements appear in an 8-page booklet on Crawford electric ranges issued by the Walker & Pratt Manufacturing Co., 31 Union street, Boston. The Crawford electric range is made in various sizes, among the principal features being the adjustable broiler, which folds out of the way under the oven when not in use. This broiler allows instantaneous adjustment of the distance between heat and food without touching the pan, without bending over. It is easy to broil fast or slow, as desired. The usual form of broiling compartment is replaced by a long, unobstructed sanitary shelf. On the 18-70 range the space underneath the broiler and cooking top is available for utensils. A novel arrangement of fuses, protected by a nickel rail, adds to the neat appearance of the range. White enamel splashers for the back and side of the cooking top add still more to the appearance and sanitary qualities of the range.

It is stated that all Crawford ranges have the new switch control board, which is so accessible in all parts and so convenient. The cooking top of the Crawford electric cabinet type ranges is made up of four round heating plates of the open type. The two front plates are of high heat capacity to be used when quick cooking is desired. The rear plates of lower capacity are sufficient for ordinary cooking. Heater plates of different capacities may be supplied on special order.

Dishwashing Machine for Hotel and Restaurant Use.

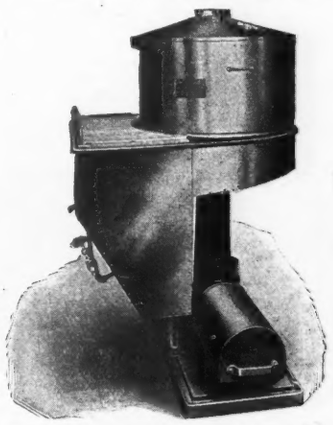
Unique principles, said to reduce the cost and labor of dishwashing in hotels, restaurants, lunchrooms, etc., to new low levels are embodied in a new type of rotary automatic dish, silver and glass washing machine made by the Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn., and shown in the accompanying illustration. This model is the "baby" of the "Autosan" line, and functions with maximum efficiency in three fields. One function is to wash all tableware in small restaurants, lunchrooms, tea rooms, coffee shops, etc. The second use is as a glasswashing machine to supplement larger dishwashing equipment in hotels and restaurants. The third function is to wash and sterilize glasses for soda fountains.

Depending on the type of service one Model "A" machine washes all tableware for from 100 to 500 persons per meal, and is operated by one man or woman. When washing glasses alone it is capable of thoroughly cleansing and sterilizing 3600 glasses per hour. The principle upon which the Model "A" machine is based is that which makes the buzz saw, for example, more efficient than the hand saw. Rotary automatic action—the buzz saw principle—is employed in this machine in the form of a rotating conveyor which carries the tableware through washing, rinsing and sterilizing sprays applied from both above and below this conveyor. The use of baskets in which to pack china and glassware before placing in the machine is absolutely eliminated, and special fibre cushions utilized in constructing the conveyor protect the china and glassware from any risk of chipping, breakage or other damage of this nature, according to the claims made.

In addition to good washing efficiency, it is said that the rapidity of the operation greatly lengthens the period of active service of the china and other articles during the meal hour, resulting in substantial reductions of the quantity of these articles needed in any given establishment. The tableware is first rotated through a hot solution, applied through powerful sprays playing on the surface of the china, glassware and silver; next, through similar sprays of hot water, and finally through a scalding blend of boiling water and live steam. To avoid rust and corrosion bronze, copper and brass is used in all of the "Autosan" machines wherever water comes in contact with metal, thereby prolonging the life of these machines.

Model "A," like all of the "Autosan" machines, is a complete automatic unit, including motor and water, steam and waste line connections. It is driven by a 1-hp. 1750 r. p. m. motor of suitable voltage installed on the base of the machine and connected both to the pumps and through a reducing gear to the conveyor, eliminating belts and chains and giving positive drive.

Model "B" is exactly similar to Model "A," except in its dimensions, and is adapted for washing all tableware for up to 1000 persons per meal, while Models "CD-3" and "CD-2" are designed to care for the requirements of establishments where over 1000 per-



Model "A" "Autosan" Dishwashing Machine.

sons are served per meal. A typical installation of a Model "CD-3" is said to have washed all tableware for 23,000 patrons a day in one large restaurant.

New Model of Walker Heavy Service Dishwasher.

Walker Bros. Co., Syracuse, N. Y., has recently placed on the market a new model H-5 electric dishwasher. It is stated that this machine, from the standpoint of sanitation, simplicity of construction and quality of material and workmanship, is meeting with great favor among hotel equipment and supply men and others. Some of the main features of this machine are thus enumerated by the manufacturer:

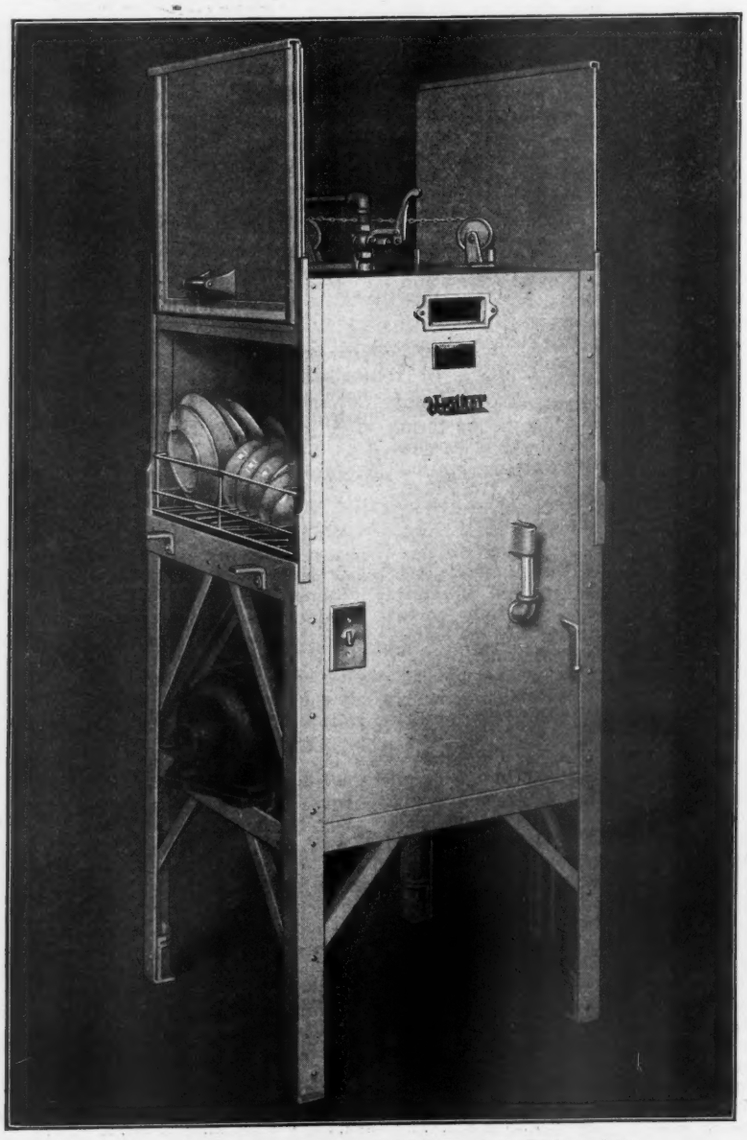
There is only one moving part in the machine; this is a simple dasher blade of special design which, revolving rapidly in the conical bottom of the machine, hurls a stripping, cleansing column of water up between and over every surface of every dish, cup, glass or piece of silver in the machine. Thus the action is uniform in every operation. There is no dependency upon water pressure—which is always a variable quantity—in the system to which the machine is connected. Four stationary nozzles in the top of the machine introduce the water for washing and rinsing.

The operation is simplicity itself. The dishes are scraped of bulky refuse or cleaned by bumping them on the rubber knob of the patented Walker refuse

hopper and then placed in the light, but sturdy trays. These trays are slid into the machine; the water is introduced through the spray nozzles and the dasher set in operation. In less than a minute it is stopped. The wash water is let out and at the same time clean rinse water is introduced and the operation repeated for but a few seconds. In many instances the operator simply depends upon the spray for rinsing. The rinse water is then left in the machine for washing the next trayload. The dishes come from the machine dry, bright, shining and ready for the shelves or immediate use.

In the matter of construction it is stated that the container is built of 40-oz. copper tinned on the inside and enameled on the exterior in a beautiful shade of light gray. All interior fittings are of brass or aluminum, and noncorroding. The gear case mechanism is equivalent to high grade automobile transmission and is readily accessible. The element of durable simplicity is rigidly maintained in this most important feature of the machine. The 1/3-hp. General Electric motors used are tested and approved before leaving the factory and are thoroughly protected by the manufacturer's guarantee. The base to which the motor is attached is a unit with the gear case, thus insuring perfect alignment at all times. The trays are durable and sturdy, yet light and easy to handle and are designed to accommodate all shapes and sizes of china, glassware and silver. They can be furnished in either wood or metal as best suits the individual requirements of the customer.

A drain and supply pipe are all the water connections necessary. No gas or steam connection is required as all have been abolished in the Walker machine.



Walker Heavy-Duty Model "H-5" Electric Dishwasher.

Induction Motor With Reversed Ventilation Path.

The induction motor takes its name from the principle by which it operates; namely, that of electromagnetic induction. There is no electrical connection between the stator, or stationary part of the machine and the rotor, or rotating element, the latter deriving its power from the former by induction. In this respect this motor is quite different from the d.-c. motor, the rotating element of which is energized by electric current brought to its windings by means of sliding contacts, including brushes, commutators, etc. It is the elimination of such devices and the consequent simplicity of the induction motor which makes it the best machine for the development of power wherever its inherent characteristics allow its use.

It operates from a.-c. power circuits, a large majority of which are polyphase circuits—usually 2 or 3 phase. Some induction motors operate from single-phase circuits. The most common power circuit used for motors of the moderate capacities is the 3-phase, 60-cycle, 220-volt circuit. The number of cycles refers to the rate of alternations of the electric current between positive and negative, some localities in this country having 50-cycle circuits, while still others have 40- and 25-cycle circuits. The voltage of these power circuits is usually 110, 220, 440 and 550, the most common voltage for motors of approximately 5 hp. and smaller being 220.

The speed of the induction motor is governed by two factors; first, the number of cycles per second of the alternating current from which it operates, and second, the number of poles developed by the motor winding. For example, a 2-pole, 60-cycle motor will operate at 60 r.p.s., or 3600 r.p.m.; a 4-pole machine on the same circuit will operate at 1800 r.p.m., and a 6-pole machine at 1200 r.p.m.—lower speeds being in direct proportion to the number of poles developed. If the frequency of the power circuit is reduced to 50 cycles motor speeds are reduced in direct proportion, a 2-pole machine then operating at 3000 r.p.m.

The stator, or stationary member of the induction motor, has its winding connected directly to the source of electric power. The stator consists of a series of coils of copper wire inserted in slots provided in iron laminations which form the stationary magnetic structure. These coils are equidistantly spaced and symmetrically connected in such a way that an electromagnetic activity is set up, which exerts an influence on the rotating element of the machine. This magnetic activity developed in and by the stator winding passes into iron laminations comprising the body of the rotor and generates electric currents in its windings, which cooperate with similar currents in the stator winding in such a way that mechanical torque or turning effort is developed on the shaft.

The rotor winding in the motor made by the S. A. Woods Machine Co., Boston, is of the squirrel-cage type, consisting of a series of bars or rods equidistantly spaced and connected by rings at each end and so resembling a squirrel cage. This winding is unique in that the bars and end rings are formed by pouring molten metal into slots provided in the magnetic core referred to above, moulds being used at each end so that end rings are formed at the same time. There are, therefore, no mechanical joints at the junction of bars and rings, the complete winding being of one piece of metal. This produces a rotor winding which is said to be indestructible so far as operation of the motor is concerned, and at the same time it provides an extremely solid and permanent construction.

The most notable characteristic claimed for these motors from an operating standpoint is that without increased size of weight over machine of equal capacity, they are semi-inclosed,

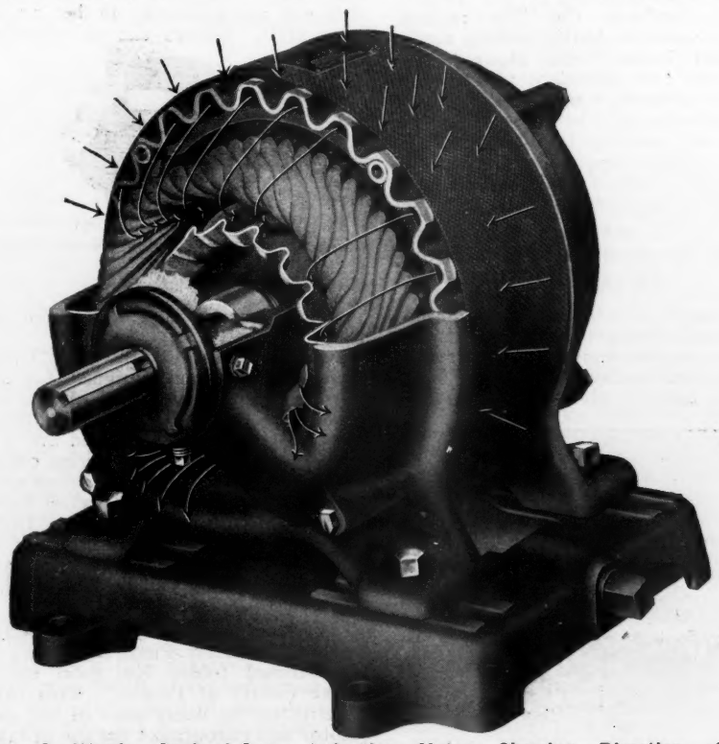
and from most practical standpoints they are totally inclosed. A unique ventilating or air-cooling system is provided in that the direction of air flow is reversed as compared to other machines, cooling air being drawn into the machine through openings located at the periphery or outside and expelled through openings in the ends. The introduction of cooling air at this point allows the use of a large area of fine mesh screen which effectively filters the incoming air and thus excludes a large amount of flying lint, dust, etc. This motor is therefore applicable to a large field, being particularly adapted for use in cotton mills, woodworking establishments, etc.

These motors are provided with sleeve bearings of the waste-packed type, such bearings giving particularly satisfactory service over long periods of time and requiring a minimum of attention. It is to be noted that oil which may gather as the result of careless filling cannot be drawn into the motor and deposited on its windings, but is forcibly expelled at the ends. Bearings are packed with wool waste, there being sufficient quantity to absorb a large amount of oil so that refilling is required at infrequent intervals. Wool is used because of its superior qualities for this purpose.

The Woods motor, as the illustration indicates, is provided with a unique casing or frame consisting of a corrugated steel shell into which the iron laminations referred to above are inserted under heavy pressure. This construction is not only light and rigid, but it contributes greatly to the effectiveness of the ventilating system described above.

A perforated metallic screen is attached to the corrugated shell on the outside so that all incoming ventilating air is drawn through its meshes. Air can enter at any point through the screen, passing over the outside of the frame corrugations, then through the circular holes along the inside of these corrugations and over the stator core, then around the ends of the stator winding and finally out through holes in the bearing heads or end-shields. The material comprising the corrugated steel casing is in intimate mechanical contact with the stator core at a number of points around its periphery so that heat generated in the stator core and winding is conducted to the casing which thus becomes an effective radiator inasmuch as ventilating or cooling air is being passed over both inside and outside surfaces of the corrugations. This construction largely increases the radiating capacity of the stator as a whole with consequent lower operating temperature, according to the statement of the manufacturer.

The screen referred to above is designed to exclude most of the floating lint, sawdust, shavings, etc., and fine dust blowing through the machine finds no oily surface to adhere to on account of the direction of air circulation.



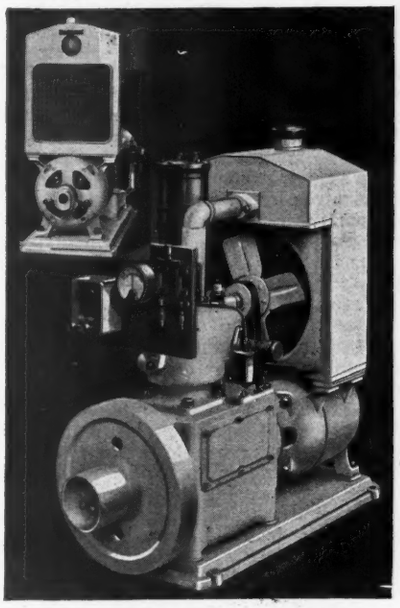
View of Woods Squirrel-Cage Induction Motor, Showing Direction of Air Circulation.

Electrical Appliance Book Issued By Westinghouse.

"Attention Getting Ads" is the title of a book of newspaper advertisements on ranges and appliances being distributed by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. Among the appliances which are shown in the book are electric flatirons, electric table stoves, electric waffle irons, electric toasters, radiant heaters, electric chafing dishes, hot water heaters, automobile engine heaters and ranges.

A Small Lighting Plant With Water Cooled Engine.

The new lighting plant being produced by the Radiant Manufacturing Co., Sandusky, O., is rated at 1.25 kw. It is water cooled and is wound for 32 volts, the set consisting of a 3.5-hp. gasoline engine, direct-connected to a General Electric generator through a flexible coupling. The plant has a driving pulley for line shaft operation. Cooling is effected by a fan driven from a crankshaft and operating inside of a large capacity radiator.

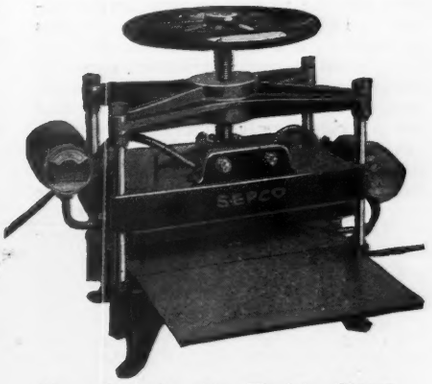


Lighting Plant Rated at 1.25 Kw.

Recent tests are said to show thorough cooling, the set carrying 15% overload without boiling away of the water in the entire period of a battery charging. This outfit is marketed entirely to dealers and contractors who operate under a franchise direct from the factory at Sandusky.

Electric Stamp Vulcanizer Added to "Sepco" Line.

A new automatically controlled rubber stamp vulcanizer is being placed upon the market by the Automatic Electric Heater Co., of Warren, Pa., manufacturer of the "Sepco" line of household and industrial electrical appliances. The "Sepco" stamp vulcanizer is said by the manufacturer to maintain a practically constant temperature of 280 deg. F., accurate control being secured by means of separate automatic switches connected to upper and lower platens of the press. The device is carefully and substantially made and is fully



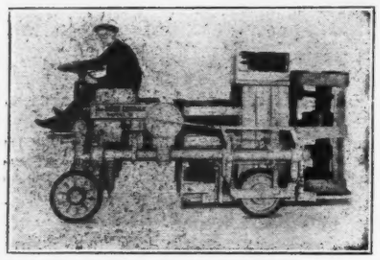
"Sepco" Automatic Electric Stamp Vulcanizer.

and liberally guaranteed. Two years of development and practical field test preceded the placing of this machine on the market.

The sale for stamp vulcanizers is much wider than is generally appreciated, no less than 615 reliable firms being listed in the business. The "Sepco" vulcanizer being simple, self-contained and requiring no expert knowledge either to sell or operate, offers a merchandising opportunity to the electrical dealer who has or intends starting an industrial appliance department. Printed matter giving complete data is being distributed by the manufacturer, the Automatic Electric Heater Co., Warren, Pa.

Ross Carrier For Handling Material in Unit Loads.

Hand transportation is rapidly giving way to power-driven devices. The most difficult material to handle is long stuff. The Ross Carrier Co., Benton Harbor, Mich., has specialized in industrial trucks for carrying long material in unit loads, and in its model 8, shown in the accompanying illustrations, is depicted a lift truck which carries any kind of a load. In the Ross system



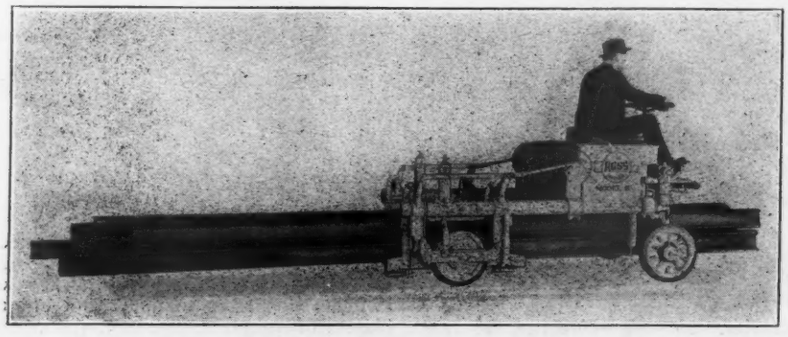
Industrial Carrier With Load of Packaged Machinery.

of "straddling" the load it is stated that there is no limit to the length or height of the load. The top of platform or bolsters need only be 4 or 5 ins. above the floor, and no small wheels are required to go underneath the platform. This is an advantage in handling heavy articles like machinery.

The material to be transported is piled on platforms or in boxes and long stuff may be placed on two simple bolsters. Loading and unloading is thus accomplished while the truck is busy doing useful work, a minute or two only being required to pick up or deposit the load. The lengths that may be handled are practically only limited by the space available for turning, and as the center of turning radius virtually coincides with the center of length of load the action is almost equivalent to a turn table.

The Ross Carrier Co. states that its lumber carrier has handled timbers 100 ft. long with ease. Package freight may be easily handled in and out of box cars with this carrier. For docks, warehouses and wholesale concerns much rehandling is frequently saved by temporary storage of the unit loads until delivery is required. For loading and unloading vessels the platforms may be arranged to hoist the load complete through the hatches where the carrier cannot be driven aboard. This carrier can be used to advantage in foundry and machine shop service in handling any kind of building material, in warehouses, or on loading platforms.

The specifications of the Ross industrial carrier are: Capacity, 4000 lbs.; length over all, 9 ft.; width over all, 4 ft. 8 ins.; turning radius, extreme outside corner, 8 ft. 4 ins.; turning radius, inside rear wheel, 12 ins.; clearance under body to floor, 30 ins.; width of load space between frames, 3 ft. 4 ins.; depth of long material that will carry under body, 2 ft.; length of platforms for loads, 6 ft. 6 ins.; width of platforms for loads, 3 ft. 2.5 ins.; speed empty (approximately), 6 mi. per hr.; speed loaded (approximately), 4.5 mi. per hr.; controller, forward and reverse, 3 speeds; motor, General Electric, 24 volts; battery, Edison, 24 cells A6; tires, front, 20 by 3½; tires, rear, 20 by 5; lift, 4 ins.; time of lift, 6 sec., and weight, with Edison batteries, 3000 lbs.



Ross Carrier Model 8 With Load of Structural Iron.

Folder Describes the "Hotpoint" Grill and Ovenette.

W. R. Ostrander & Co., 371 Broadway, New York City, have issued folder No. 107 illustrating and describing briefly the "Hotpoint" electric grill and ovenette manufactured by the Edison Electric Appliance Co. The radiant grill is a portable electric cooking appliance that broils, boils, stews, fries, toasts—any two operations at the same time. The ovenette supplements the usefulness of the grill by the addition of baking and roasting to the list of its cooking applications. The ovenette is used on the radiant grill and can also be used on an electric range.

Swivel Connections for Fixture Suspension.

The Appleton Electric Co., Chicago, has recently brought out a line of outlet box covers equipped with swivel fixture joints or hubs for either ⅜-in. or ½-in. conduit; also a "Unilet" swivel fixture joint and a combination hickey and swivel fixture joint. Two accompanying illustrations show raised covers with swivel fixture joints or hubs. These covers are made for 3 and 4-in.

Raised Cover Plate for Swivel Fixture Joint Suspension.

round and octagonal boxes. Covers are also made for 4-in. square boxes. Swivel fixture joints allow the reflectors to hang in correct position at all times, even though the outlet box be installed at a slight angle. The flexibility of this

Raised Cover Plate With Swivel Joint in Place.

fixture joint or hub prevents the breaking of the fixture at the point of suspension, and the fixture will always hang plumb even though it may be jarred. This swivel fixture joint or

"Unilet" Swivel Fixture Joint for Suspended Fixtures.

hub also allows for fixture to swing through an angle of approximately 15 deg. from the perpendicular on one style and approximately 45 deg. on the other style. Covers can be furnished

Combination Hickey and Swivel Fixture Joint.

in black enamel and galvanized finishes.

Another illustration shows a "Unilet" swivel fixture joint designed for supporting suspended types of fixtures. When used with "Unilets" this fixture joint supports the fixtures and the "Unilet" provides the space for wiring connections. The remaining illustration shows a combination hickey and swivel fixture joint similar in design to the "Unilet" swivel fixture joint. This fitting can be screwed onto the fixture stem after which the wiring can be completed.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has just issued folder No. 4456 entitled "The Center of Power." This folder illustrates the many uses of the small motor and encourages the use of labor-saving machines in the home, office, shop and farm.

ACTIVITIES IN THE TRADE

Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests

Heine Safety Boiler Co., 5319 East Marcus avenue, St Louis, plans to change its name to the Heine Boiler Co.

National Fibre & Insulation Co., Yorklyn, Del., has broken ground for the erection of a 2-story addition to its plant, 139 by 160 ft.

Regina Co., 47 West 34th street, New York City, has recently issued a folder on the company's financing plan for "Regina" vacuum cleaner dealers.

Wagner Electric Manufacturing Co., St. Louis, has opened a factory branch at 538 First avenue South, Seattle, Wash., which is in charge of M. E. Cundall.

Electrical Manufacturing & Repair Co., Pittsburgh, sustained a loss by fire recently when a portion of its plant located at Fourth avenue and Fancourt street burned.

Meehan Manufacturing Co., Milwaukee, manufacturer of farm-lighting systems, has changed its name to the Jackson Light Manufacturing Co. and moved to Jackson, Wis.

Western Tractor Co., which has been located at Wichita, Kan., has completed negotiations with the Joplin Chamber of Commerce and will remove its $500,000 plant to Joplin, Mo.

Driver-Harris Co., Harrison, N. J., of which Frank L. Driver is president, manufacturer of resistance wires, etc. has arranged for a bond issue of $1,250,000 for general operations, financing, etc.

Western Union Telegraph Co., 195 Broadway, New York City, will construct a pole line with wire structure from Northumberland to Scranton, Pa., about 85 mi. with cost estimated at $100,000.

Edison Lamp Works of General Electric Co. employes of the Newark, Harrison and Ampere, N. J., plants held their annual excursion July 18 at Asbury Park, N. J., under the auspices of the recently organized Employe's Benevolent Association, of which Samuel N. Whitehead is president; Robert Ball, vice-president, and Joseph Shinn, treasurer.

Leeds & Northrup Co., 4901 Stenton avenue, Philadelphia, is now issuing bulletin No. 871R, treating the problem of temperature measurements in generators, cable systems and transformers. The various types of instruments which this company manufactures for this purpose are described and illustrated and the subject discussed at length.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has announced a 10% reduction on prices of practically all of its industrial motors and motor control apparatus, including also all d.-c. generators and motor generators. This is the second cut of 10% made by this company in motor prices during this year. There is also a reduction in prices on heating appliances, such as toaster stoves, irons, chafing dishes, cozy glow radiators, etc. The new prices are to take effect immediately.

H. R. Worthington Co., Harrison avenue, Harrison, N. J., has tendered an offer of $8,459.27 to the city for 14 lots on Wilhelm and Sussex streets, to be used for proposed extensions to its local plant, devoted to the manufacture of pumping machinery.

Foster-Songer Co., Park building, Pittsburgh, has announced the appointment of Theodore L. Dodd & Co., 80 East Jackson boulevard, Chicago, as district sales agent for the Middle West. The line consists of seamless lap weld and charcoal iron boiler tubes, also seamless steel mechanical tubing, pipe and casing.

Pacent Electric Co., Inc., 150 Nassau street, New York City, of which Louis G. Pacent is president, has increased its capital stock from $15,000 to $50,000 for the purpose of financing the marketing of several patented devices useful in the electrical and radio field. The company plans to let its manufacturing out under contract, although it contemplates erecting its own plant in the near future.

Western Pump Co., Davenport, Ia., has purchased the plant of the Wahle Machine & Foundry Co. for $40,000. The Western Pump Co. plans a bond issue of $200,000. Ernest E. Bell, former vice-president of the Hydraulic Steel Co. of Cleveland, now vice-president and treasurer of the Western Pump Co., is now in charge of the bond issue which that company is preparing to issue.

Sorgel Electric Co., 138 West Water street, Milwaukee, has issued a new bulletin describing some of the uses and advantages of its air-cooled balancing coils and auto transformers which the company has been manufacturing for a number of years. The bulletin also illustrates a connecting diagram which, together with the other information given, should prove of interest to the electrical industry.

P. A. Geier Co., Cleveland, maker of the "Royal" electric cleaner, has recently issued a service manual containing what is stated to be a good explanation of methods by which the service department of a dealer in appliances can easily be turned from an overhead expense and put on a money-making basis. In addition the manual contains data for general salesmen and repairmen concerning the structure of the "Royal" cleaner and short-cut methods of "trouble shooting."

General Electric Co., Schenectady, N. Y., has issued an 8-page illustrated booklet describing and illustrating steam turbines for mechanical drive. According to the booklet these turbines have been successfully developed for driving circulating and boiler feed pumps, as well as centrifugal pumps, fans, blowers, etc. The turbines may be designed for either condensing or noncondensing operations, and can be adapted for any steam pressure from 60 to 250 lbs., either dry or superheated steam, and for speeds from 1200 to 5000 r.p.m. A description of the principle involved in these turbines, and a summary of the parts, including wheel, shaft and buckets, wheel casing, bearings, packing, governor and governor valve, emergency governor and other parts, is given.

Henry D. Sears, general sales agent for Weber wiring devices, 80 Boylston street, Boston, has announced that arrangements have been concluded whereby the Holabird Electrical Co., Hobart building, 582 Market street, San Francisco, and 451 East Third street, Los Angeles, will act as sales representative on the Pacific Coast. Under the general direction of R. D. Holabird the Sears' interests will be in charge of H. A. Sayles, secretary of the Holabird Electrical Co. A complete and adequate stock of Weber wiring devices will be carried in the Holabird warehouse in San Francisco.

Electric Furnace Co., Alliance, O., has announced that it received more orders for its Baily electric furnaces in June than in any single month in the last 2 years. These orders include standard brass melting units, car furnaces for steel-plant purposes, and a special electric enameling equipment. Most of the sales were made to concerns not particularly busy at the present time, but who purchased this equipment with a firm belief that by the time the furnaces were installed and ready for operation business would be such as to amply justify the present expenditure. Indications point to an equally good month in July. The foundries are exhibiting a desire to modernize their equipment so as to lower their cost of production and meet competition when business again becomes normal. One of these recent sales, to the Empire Brass Manufacturing Co., Ltd., London, Ont., marks the fifth Baily furnace sold in Canada during the past year. It is the second Baily furnace for this plant. It is rated at 105 kw. and has a hearth capacity of 1500-2000 lbs. The Mueller Metals Co., Decatur, Ill., has ordered three 105-kw. Baily furnaces each with 1500-2000 lbs. hearth capacity. The entire battery will be used for melting brass in the Decatur plant. The Ingram Richardson Manufacturing Co., Beaver Falls, Pa., has awarded a contract for a 600-kw. Baily electric enameling furnace. This is to be a rotating car type furnace arranged to travel on a circular platform 60 ins. diam. The equipment will have a heating capacity of 44 tons of material per day.

PERSONAL MENTION

Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry

J. JOHNSON has been appointed superintendent of utilities at Prince Albert, Sask., Canada.

GEORGE B. HARRIS, York Haven, Pa., has been re-elected president of the York Haven Water & Power Co.

WILLIAM M. EADER, Frederick, Md., has been appointed engineer in charge of the municipal electric plant and system.

A. F. ZACHER has resigned as district manager of the Buffalo office of the Economy Fuse & Manufacturing Co., Chicago.

P. H. SMITH has been appointed manager of the power division of the Atlanta office of the Westinghouse Electric & Manufacturing Co.

ALEX DOW, president and general manager of the Detroit Edison Co., has been elected a member of the board of directors of the Detroit United Railway Co.

CHARLES W. TIPPY, who has been general manager of the Consumers Power Co., Jackson, Mich., since 1914, has been elected vice-president of the company.

JAMES DIXON, who for the past year has been production manager of the Reliance Electric & Engineering Co., Cleveland, has been made works manager of the company.

GALEN CROW, of Oklahoma City, has been appointed manager of the Public Service Co. of Oklahoma at Tulsa. For several years he was manager of the Guthrie, Okla., office of the company.

WALTER J. KOHLER, president of the Kohler Co., Kohler, Wis., manufacturer of farm lighting plants, etc., has been elected president of the Board of Regents of the University of Wisconsin.

WALTER A. SHAW, special technical expert, formerly of the Illinois Public Utility Commission, has been engaged by the Board of Public Utility Commissioners of New Jersey, to assist the commission in special rate hearings.

EVERETT MORSS, president of the Simplex Wire & Cable Co., 201 Devonshire street, Boston, who recently returned from a 9 wks.' tour in Europe, was tendered a complimentary dinner early this month at the Boston City Club by 37 members of the company's organization.

RICHARD MUELLER, who was recently elected assistant secretary of the Commonwealth Edison Co., Chicago, to succeed William S. Kline, who resigned to become vice-president of the Lake Shore Trust & Savings Bank, has been connected with the Edison company for 21 yrs., starting in as a stenographer and being later appointed private secretary to Vice-president W. A. Fox. From this position he was made chief clerk in the office of Mr. Fox. During the past 10 yrs. most of Mr. Mueller's energies have been directed along the line of increasing efficiency by introducing modern methods in the various departments that come under the jurisdiction of Vice-president Fox.

F. E. L. WHITESELL, who for several years has been connected with the sales department of the Railway & Industrial Engineering Co., Greensburg, Pa,. has been appointed the New England representative of the company with headquarters of 136 Federal street, Boston. Mr. Whitesell is a graduate of Washington and Jefferson College and during the world war served with the Ambulance Corps in France.

F. E. L. Whitesell.

CHARLES H. DRAKE, formerly assistant division traffic engineer with the Western Union Telegraph Co., Lake Division, Chicago, has been appointed supervisor of automatics for the Canadian National Telegraphs, with headquarters at Toronto, Ont.

F. T. WHITING, manager of the engineering division of the Chicago office of the Westinghouse Electric & Manufacturing Co., has been appointed manager of the industrial division of that office, to succeed N. G. Symonds, who was recently made manager of the Chicago office.

OBITUARY.

HENRY S. MANNING, a former partner in the machine tool firm of Manning, Maxwell & Moore, Inc., 119 West 40th street, New York City, died July 9 at the age of 76 yrs. He was a member of the American Society of Mechanical Engineers and the Union League Club.

FRED E. OBERMILLER, plant department official of the Southwestern Bell Telephone Co., died at Rushberg, Mo., July 12. He had been associated with the Bell System for 30 yrs. At the time of the change from aerial to underground in St. Louis, in 1898, he was in charge of the underground cable installation. Later he was made superintendent of suburban construction and at the time of his death was district plant superintendent, with headquarters at Poplar Bluff, Mo.

FRANCIS BACON CROCKER, PH. D., noted electrical engineer, died July 9 in his apartment at 507 Madison avenue, New York City, in his 61st year. He was born in New York City July 4, 1861, and was graduated from the School of Mines of Columbia University in 1882, and later founded the School of Electrical Engineering at Columbia University, being head of that school for nearly 20 yrs. His most conspicuous contribution to the electrical industry was the commercial motor, the first of which was put into use in 1886. In company with Dr. Schuyler S. Wheeler and Charles G. Curtis he produced these motors, which were the forerunners of the present electrically driven motors. In addition to his scientific and scholastic work he was active in the commercial applications of electrical equipment, being one of the founders of the C. & C. Co. and the Crocker-Wheeler Co., of which he was a director at the time of his death. Dr. Crocker and Dr. Wheeler were among the first, if not the first, inventors of the electric motor, and Dr. Wheeler is now, as he has been for some time, at the head of the Crocker-Wheeler Co., Ampere, N. J. One of the objects of Dr. Crocker's long career in the electrical industry was to obtain a complete standardization of electrical equipment throughout the world. In connection with this work he was one of the two American delegates to the International Electrotechnical Commission in London. During the war Dr. Crocker was an advisor to the members of the Naval Consulting Board and in company with Peter Cooper Hewitt he developed the first helicopter in this country which was capable of flight. He is survived by a brother, Major David Crocker, and two sisters, Mrs. Henry C. Mortimer and Mrs. G. W. Kelley. Characterizing Dr. Crocker as one of the leading electrical engineers of the world, Thomas A. Edison said that "the electrical industry owed a debt of gratitude to the former Columbia University professor, whose death removes one of the outstanding pioneers of the electrical industry. His work and teachings as founder and head of the School of Electrical Engineering at Columbia University contributed much to the growth and importance of the electrical development of this country. As the first chairman of the Standardization Committee of the American Institute of Electrical Engineers, Dr. Crocker's painstaking work earned the lasting gratitude of everyone connected with the electrical industry throughout the world." Professor Crocker served as president of the American Institute of Electrical Engineers in 1897-8.

BUSINESS OPPORTUNITIES

News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies

EASTERN STATES.

Lawrence, Mass.—Electrical equipment will be installed in the factory addition to be erected by the David Brown Co., Market street, manufacturer of shuttles and other textile equipment, estimated to cost $40,000.

Worcester, Mass.—A power plant, with 100 ft. stack, will be erected by the M. J. Whittall Associates in connection with the erection of a weave shed at their carpet mills, estimated to cost $125,000.

Ansonia, Conn.—A 1-story power house will be erected by the Ansonia O. & C. Co., in connection with a new 2-story addition to its textile mill.

Hartford, Conn. — The Stanislaus Electric Power Co. has filed notice of dissolution under state laws.

Woonsocket, R. I.—Electrical equipment will be installed in the 3-story addition to be erected at the plant of the Shambow Shuttle Co., manufacturer of textile equipment, 84 by 158 ft., estimated to cost $100,000. Lockwood, Greene & Co., Boston, Mass., are architects and engineers.

Binghamton, N. Y.—Architects Russomello & Price, 226 Scranton Life building, Scranton, Pa., have completed plans for the erection of a power plant here, 76 by 76 ft., estimated to cost $32,000. The owner's name will be announced at an early date.

Fort Niagara, N. Y. — Electrical equipment will be installed in the local filtration plant to be erected by the Construction Quartermaster, U. S. Army, estimated to cost $30,000.

New York, N. Y.—Electrical equipment and electrically operated machinery will be installed in the 3-story plant to be erected at 73rd street and Avenue T, by the Lorillard Tobacco Co., 119 West 40th street, estimated to cost $150,000, with machinery.

New York, N. Y. — Electrically operated freight handling equipment, etc., will be installed on the six piers to be constructed by the Dock Commission. The first structure will be located at the foot of Canal street, North River. Each pier will be about 1000 ft. in length. Murray Hulbert, Dock Commissioner, is in charge.

Rochester, N. Y.—Electrical equipment will be installed in the proposed plant to be erected by the Mayer Coating Machines Co., on Scottsville road. G. Morton Wolfe, 1377 Main street, Buffalo, is architect.

Springville, N. Y.—The Common Council has approved a bond issue of $100,000 for the construction of a dam to be used for municipal hydroelectric power generation. The work is estimated to cost the full amount of the bond issue.

Syracuse, N. Y.—Considerable electrical equipment will be installed in the proposed pottery to be constructed by the Onondaga Pottery Co., 1858 West Fayette street, manufacturer of earthenware products. The plant will be located on Court street, and is estimated to cost $500,000 with machinery. Guy L. Noble, Union building, engineer, has prepared plans.

Whitney's Point, N. Y.—The Point Electric Co. has been incorporated with a capital of $15,000 to operate a local light and power system. The incorporators are P. H. Landers, H. J. Walters and E. B. Jenks.

Ampere, N. J.—Considerable electrical equipment will be installed in the addition to be erected at the plant of the Ward Baking Co., estimated to cost $450,000. A permit for the work has been issued.

Newark, N. J.—Electrical equipment will be installed in the 11-story club house to be erected on Park place by the Newark Athletic Club, estimated to cost in excess of $1,500,000. The contract for the structural work has been let to the George A. Fuller Co., New York City. Herbert Reid is president of the club.

Passaic, N. J.—Electrical equipment will be installed in the proposed 4-story addition to be erected at the plant of the Passaic Worsted Spinning Co., Ninth street, estimated to cost $36,000.

Trenton, N. J.—The Board of Public Utility Commissioners has called a hearing Aug. 3 to inquire into the reasonableness of the 25% additional charge made by the Public Service Electric Co., Newark, for wholesale power and kilowatt-year customers on the lines.

Dover, Del.—The Borough Council has completed plans for the erection of a power house. W. E. S. Dyer, Land Title building, Philadelphia, is engineer.

Wilmington, Del.—The Clarion District Hydroelectric Co. has been incorporated under state laws with a capital of $2,000,000, to operate hydroelectric power plants and systems. The local incorporators are M. M. Lucey, V. P. Lacey and L. S. Dorsey.

Carlisle, Pa.—Electrical equipment will be installed in the cold storage plant to be erected by Jesse B. Brown, Pitt and Locust streets.

Glen Rock, Pa.—A number of new electric light and power companies have been organized, each with nominal capital of $5000, to operate under one management in this section. The different companies are the North Codorus, Hopewell, Springfield and Shrewsbury Township light and power companies, and the New Salem, Seven Valley, Jefferson, Loganville and Shrewsbury light and power companies. H. B. Keller is treasurer. The merger will be carried out under the name of the Glen Rock Light, Heat & Power Co. The combined organization will operate in the lower section of York county.

Harrisburg, Pa.—Electrical equipment will be installed by the Water Department in connection with extensions and improvements in the local water supply system, estimated to cost $800,000. Bonds for this amount have been approved by the City Council.

Harrisburg, Pa. — The city has awarded a contract to Wagner & Ferguson, Harrisburg, for the installation of an underground conduit system for the new street lamps to be installed in the State Capitol park.

Philadelphia, Pa.—The Quaker Lace Co., Somerset street, has taken out a permit for improvements in its power house.

Philadelphia, Pa.—Plans have been filed for the erection of an addition to the power house at the rug manufacturing plant of John Bromley & Sons, Front street and Lehigh avenue.

Philadelphia, Pa.—A power plant will be erected by the Logan Baking Co. in connection with its 3-story baking plant to be constructed on a local site, T. Frank Miller, 1012 Walnut street, is architect.

Philadelphia, Pa. — The Orinoka Mills, Ruth street, have taken title to the 1-story power plant at Reading Railway avenue and Jasper street, to be used in connection with its textile works.

Philadelphia, Pa.—The Bureau of Health, City Hall, has commenced the erection of an addition to its power house at 34th and Pine streets.

Pittsburgh, Pa. — The Duquesne Light & Power Co. is said to have preliminary plans under way for the erection of additional units at its new electric generating plant at Ohrswick, Pa. Two plant units have been completed and ultimately six units will be placed in service. The total cost is estimated at $15,000,000. A. W. Thompson is president.

Baltimore, Md.—Considerable electrical machinery will be installed in the paper mill to be constructed in the Gwynne Falls section by the Gwynne Falls Paper Co., 517 Calvert building, estimated to cost $250,000. Bids will be asked at an early date. Joseph H. Wallace, 5 Beekman street, New York City, is engineer.

Baltimore, Md.—The Standard Oil Co. his filed plans for the erection of a 1-story pumping plant at its works at First avenue and 14th street, Canton district.

Cambridge, Md. — The Dorchester Water Co. and the Cambridge Ice Co. are planning the rebuilding of their plant, operated jointly, destroyed by

fire recently, with loss estimated at $70,000, including electrical and other machinery, engine house, etc.

Altavista, Va.—The Red Cedar Chest Co. will install considerable electrical equipment in connection with the rebuilding of its plant, recently destroyed by fire, to be 1-story, 60 by 500 ft., and estimated to cost $125,000. The Aberthaw Construction Co., Boston, has the general building contract.

Charlottesville, Va. — Electrical equipment will be installed in the 3-story automobile service and repair building to be erected by the Welch Automobile Co., with cost estimated at $50,000.

Norfolk, Va.—Electrical and mechanical equipment will be installed in the filtration plant to be constructed by the Water Bureau of the city, at a cost of $268,000. The general contract has been let to the Sanford & Brooks Co., Water street, Baltimore.

Waynesboro, Va.—The South River Mutual Telephone Co. has been organized by local interests and granted a state charter. The company is planning the construction of a system from Waynesboro to Basic, Va., and vicinity.

Logan, W. Va.—The Chesapeake & Potomac Telephone Co. will expend $250,000 in replacing a system for battery apparatus, installing generators and switchboards. The change affects over 500 telephones. C. A. Sillings is in charge.

Charlotte, N. C.—The Southern Power Co. has applied to the Federal Power Commission for a license to construct a transmission line from Westminster, S. C., to Talulah Falls, in Oconee county, S. C. to be used for public utility purposes.

Dunn, N. C.—The Carolina Light & Power Co., Raleigh, N. C., has acquired the local municipal light and power plant. The plant will be improved and the local distributing system extended. A transmission line will be constructed from Benson to Dunn.

Goldsboro, N. C.—The State Hospital for the Insane, of which Dr. W. W. Faison is director, has plans under way for the erection of a power and ice plant at the institution, estimated to cost $75,000. Wiley & Wilson, Lynchburg, Va., are engineers.

Jeffersonville, Ga. — The Jeffersonville water and light plant burned recently. Address the mayor.

Rock Mart, Ga. — The Common Council has closed negotiations with the Georgia Railway & Power Co., Atlanta, Ga., for furnishing local service. The city will construct a transmission line, about 25 mi. in length, to make a connection with the company's system. A local substation will be built.

Florida City, Fla.—The City Council is planning a bond issue of $30,000 for extensions in the lighting system and other municipal improvements. C. B. Clinton is acting town clerk.

Green Cove Springs, Fla.—The Common Council is considering a bond issue of $150,000 for the erection of an addition to the municipal electric power plant, and other improvements.

Merritt, Fla.—The Merrit Island Light & Power Co., has been incorporated with a capital stock of $10,000. Address O. R. Grosse, president, Merritt.

Millville, Fla.—The Common Council has perfected plans for the installation of a new municipal electric light and power plant.

Wauchula, Fla.—The Hardee Power & Ice Co., of which J. G. Fancy, Fort Meade, Fla., is president, will establish an electric power and ice plant. The work will commence Oct. 15.

NORTH CENTRAL STATES.

Cleveland, O.—The Telling, Belle, Vernon Co., Cedar avenue, operating a local dairy plant, is completing plans for the erection of a 1-story power plant on Carnegie avenue, 45 by 75 ft., estimated to cost $50,000. A. C. Bishop, 427 Guardian building, is engineer.

Defiance, O.—Considerable electrical equipment and machinery will be installed in the local sugar mill to be constructed by the Farmers' Sugar Co, Defiance, estimated to cost $1,000,000. Charles H. Allen is president.

Piqua, O.—The Orr Felt & Blanket Co., is having plans prepared for the erection of a 1-story power plant addition.

Bloomingdale, Mich. — The Inter-Community Welfare Association has been formed in Bloomingdale, Bohlesville and Berlamont to interest investors in a proposal to erect a lighting plant to furnish residents of the three villages with light and power. Address Ellis Simon, Bloomingdale.

Columbus, Ind.—The Mutual Ice & Coal Co., recently organized, is planning the erection of an ice-manufacturing plant to cost about $60,000, including machinery. J. R. Dunlap is president, and Courtney Moore, treasurer.

Columbus, Ind.—Considerable electrical equipment will be installed in the oil refining plant to be erected on a site near the city by the Indiana Oil Refining Co.; it will consist of five buildings, and is estimated to cost $500,000. O. L. Bartlett is president.

Kendallville, Ind.—The city will build a boiler house at the water works and electric light plant. The estimated cost is to be $25,000.

Logansport, Ind.—Bids were received July 21 by the Board of Public Works for one 6000-kw. steam turbine-alternator and surface condenser with appurtenances, to be erected in the city municipal plant. Address Board of Public Works, Edwin Ash, president.

Evanston, Ill.—A petition from the St. Francis Hospital and residents of Evanston residing in that vicinity requested that more street lamps be installed in their neighborhood. The matter was referred to the Board of Local Improvements.

Hillsboro, Ill.—Authority to construct and operate a transmission line from Duquoin to Mount Vernon and the village of Waltonville has been granted to the Southern Illinois Light & Power Co. by the Illinois Commerce Commission.

Johnston City, Ill.—J. M. Lines of Marion, was awarded the contract for a "white way" lighting system. The lighting system is to cost $4180 and is to consist of 34 lamps.

Springfield, Ill.—The committee of five will confer with city officials relative to the better lighting of Fourth street. Henry Ettelbrick is chairman of the committee. The committee will ask that the pre-war system be restored. The standards are owned by the Springfield Gas & Electric Co.

Spring Valley, Ill.—The City Council has planned that a small motor be used in pumping air for the oil engine.

Oconto, Wis.—The Oconto Light & Power Co. has been incorporated with a capital of $25,000. A. F. Pamperin, V. J. O'Kelliner and Carl O. Neuman, are the incorporators.

Two Rivers, Wis.—The Wisconsin Manufacturing Co. will soon commence the construction of a power house in connection with its proposed new local plant. G. C. Kirst is president.

Paullina, Ia.—Municipal light bonds to the amount of $39,000 were authorized by vote June 28.

Kirksville, Mo.—The Missouri Farmers' Association is considering plans for the erection of cold storage plants at Kirksville and Moberly, Mo.

Rayville, Mo. — The Excelsior Springs Light, Heat & Power Co. has been granted a 20-yr. franchise by the City Council of Rayville and will construct electric light and power lines. A special election was called July 21 by the council to vote upon a special lighting tax for street lamps.

Sikeston, Mo.—The Sikeston electric light plant, ice factory and laundry plants were destroyed by fire recently, with a loss estimated at $200,000.

Pawnee City, Neb.—Bids were received July 22 for the furnishing of material to complete the reconstruction of the city's present electric light plant. One 150-hp. and one 400-hp steam engine with d-c. generators; one 5-panel switchboard; two 150-hp. firetube boilers with suspension setting and steel casing, etc. will be installed. Address Frank S. Calwell, mayor.

SOUTH CENTRAL STATES.

Walton, Ky.—The Dixie Light & Power Co., recently organized, has awarded a contract to the Hoosier Engineering Co., Indianapolis, Ind., for the construction of a transmission line from Florence, Ky. to Walton. R. W. Jones is secretary and general manager.

Louisville, Ky.—The Kentucky Utilities Co. has acquired the power plants of the W. G. Duncan Coal Co. at Greenville, Ky., and St. Bernard Coal Mining Co., Earlington, Ky., and will operate the stations for service in this district. Improvements are planned. A transmission line will be built for a total distance of about 158 mi. estimated to cost $500,000.

Columbia, Tenn.—W. B. Greenlow plans to install an electric light gen-

erator and crude oil engine to operate 1000 50-watt lamps.

Starkville, Miss.—The State Bond Improvement Commission, Jackson, Miss., Theodore C. Link, Director of Public Works. in charge, will build an electric power plant at the Mississippi Agricultural and Mechanical College.

Abbeville, La.—A special election has been called for Aug. 23 to vote bonds for the construction of a municipal light and power plant. Address the mayor.

Baton Rouge, La. — The Baton Rouge Electric Co. is planning the construction of a power line to Dixie, with local distributing branches, estimated cost $200,000. T. L. Small is manager.

Dallas, Tex.—The City Council has perfected plans for the construction of additions to the lighting system in the Highland Park section.

Marshall, Tex.—Considerable electrical and mechanical equipment will be installed at the proposed gasoline plant and affiliated works of the Industrial Gas Co., estimated to cost $350,000. The Hope Engineering & Supply Co., Mt. Vernon, O., is in charge of construction. W. H. Sedberry is engineer.

Orange, Tex.—Electrical equipment will be installed in the proposed local oil refinery to be constructed by the Reclamation Oil Co, recently organized with a capital of $2,000,000. J. E. Pike is president.

WESTERN STATES.

Centralia, Wash.—The erection of a 2-story plant and office building at the corner of Pearl and Maple streets to house the substation and offices of the municipal lighting system is provided in an ordinance passed by the City Commission. The new structure will cost about $75,000 and will be paid for with municipal bonds. Plans for the building will be drawn immediately and construction bids called as soon as they are completed. Wohleb & Stanley, Olympia, are the architects.

Everett, Wash.—Louis Lesh, city clerk, was authorized to file for permission to flood the shore lands of Lake Champlain. The permit is a step in the plans the city commissioners are outlining for a hydroelectric power plant that includes Lake Champlain as a storage reservoir, both for power plant and city water supply.

Ilwaco, Wash.—An ordinance has been passed giving to the Ilwaco Light & Power Co. a franchise to place, erect and maintain poles and other appliances for maintaining lighting and power service.

Spokane, Wash.—The Washington Water Power Co. has applied to the Federal Power Commission for a preliminary permit to construct a dam and power house at Kettle Falls, in the Columbia river in Stevens county, Wash., to be used for public utility purposes.

Fresno, Cal.—The San Joaquin Light & Power Corp. has applied to the Federal Power Commission for a preliminary permit covering three projects as follows: No. 1, Diversion dam in Kings river, and tunnel 8 mi. to the applicant's proposed Kings river power house; No. 2, diversion dam in Roaring river and tunnel 2.5 mi. to power house; No. 3, dam in Bubbs creek and tunnel 0.75 mi. to power house; to be used for public utility purposes.

Pine Knot, San Bernardino County, Cal.—James Hulme, W. E. McKinnon and Albert H. Piepenburg have applied to the Federal Power Commission for a license to construct a transmission line from the line of the Southern Sierras Power Co. to the Gold Mouutain mine 25 mi. long, to be used for power for mining.

Sacramento, Cal.—The Excelsior Water & Mining Co. has made application to the California Water Power Commission for permission to utilize waters in the state for proposed hydroelectric development: Middle fork Yuba river, Sierra and Nevada counties, 7890 theoretical hp. plant capacity, estimated cost, $1,600,000; Canyon Creek, Nevada county, 16,000 t. hp., estimated cost, $2,556,000; Deer Creek and Excelsior Ditch, 42,000 t. hp., estimated cost, $5,279,000; Poorman Creek, Nevada county, 2100 t. hp. plant capacity, estimated cost, $3,000,000; additional power site on Deer creek, Nevada county, 12,000 t. hp. plant capacity, estimated cost, $2,073,000.

City of Mexico, Mexico.—Extensions of the power transmission system of the Mexico Light & Power Co. are to be made as soon as the necessary material and equipment can be obtained, it is stated here. Power which is generated by the hydroelectric plant of the company at Necaxa, more than 100 mi. from the City of Mexico, is transmitted to the capital, Puebla and El Oro. It is now proposed to build additional transmission lines to several other cities and industrial centers within a radius of 150 mi. of Necaxa. Deferred plans for enlarging the hydroelectric plant also are to be carried out.

Puebla, Mexico—S. Pearson & Son, Ltd., the British firm of which Lord Cowdray is the head, plans to make important additions and improvements to its hydroelectric plant near Orizaba and to its street railway and lighting plants in Vera Cruz and Tampico. The plant near Orizaba provides power and lights for Puebla by means of a transmission line. The transmission system is to be extended to other cities and industrial centers of this part of Mexico, but will not encroach upon the territory occupied by the transmission system of the Mexican Light & Power Co.

INCORPORATIONS

Philadelphia, Pa.—L. J. Marsh Electric Co. Capital, $10,000. To deal in electrical products. H. P. Woodcock, 1226 South 45th street, treasurer.

Boston, Mass.—Acme Electric Heating Co. Capital $10,000. To manufacture electric heating equipment and appliances. George A. Rice, president, and Harry Price, 32 Clifford street, treasurer.

Pittsburgh, Pa.—Model Electric Manufacturing Co. is being organized by Theodore H. Heuber, Frank J. Morris and John H. Lauer, 1608 Commonwealth building, to manufacture electric light and power equipment, electrical machinery, etc.

Wilmington, Del.—General Heating Appliance Co. Capital, $200,000. To manufacture electrical heating appliances, etc. Local incorporators: T. L. Croteau, C. H. Maxwell and M. A. Bruce.

Evansville, Ind.—Hoosier Farm Light Co. Capital, $50,000. To manufacture isolated electric power plants for farm service. Incorporators: J. J. Morris, Benjamin Bosse, and W. A. Koch.

Norfolk, Va.—Automatic Light & Power Corp. Capital, $24,000. To deal in light and power plants for farm service, and other electrical equipment. V. K. Cullen, president; and R. P. W. Taylor, secretary-treasurer.

Buffalo, N. Y.—Buffalo Smoke Preventing Corp. Capital, $100,000. To manufacture fuel-saving and smoke-prevention equipment. Incorporators: E. C. Hock, W. A. Wilson and C. H. Cutting.

Boston, Mass.—Crescent Electric Co. has filed notice of organization to manufacture electrical specialties. John A. Rein, 722 Hyde Park avenue, heads the company.

New York, N. Y.—Tindall & White, Inc., Capital $100,000. To manufacture electric lamps and other electrical equipment. Incorporators: M. H. Ward, F. S. Learnan, and C. A. White, 291 Broadway.

New York, N. Y.—Apex Chandelier Co. Capital $20,000. To manufacture electrical fixtures. Incorporators: H. Tepfer, L. C. Kurchenoff and L. Sacks, 50 Court street, Brooklyn.

FOREIGN TRADE.

[Addresses of firms referred to in these trade opportunities may be obtained by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or its branch and local co-operative offices. Request for each opportunity should be on a separate sheet and the file number given.]

Electric Furnaces (35,142)—A manufacturing firm in Chile desires to be placed in communication with manufacturers of electric furnaces for rolling mills. This furnace should be of an approximate capacity of 5 to 7 tons per day of 24 hrs. References.

Electrical Supplies (35,075)—A firm of general merchants in India desires to purchase 50, 100, 200, 500 and 1000 cp. lamps, with 50, 100 and 200 cp. fittings with nipples for ordinary ⅝-in. lamp holders, suitable for hanging, provided with tees with insulators on the top and 2-wire leads, with enameled reflectors painted black outside, white inside; 50 and 1000 cp. globes with hole in the glass for ventilation, all to be arranged so that if it is not desired to hang them, insulated tees can be removed so as to take 0 5-in. gaspipe instead; insulated suspenders, threaded for 0.5-in. gaspipe, with two separate wire leads, with insulator on top, and 0.5 and 0.75-in. recessed baseplates, threaded for gaspipe, with round flange for fixing. Quotations should be given f. o. b. American port. No references offered.

FINANCIAL NEWS

Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks

Bond Issue Planned by American Power & Light Co.

The American Power & Light Co., 71 Broadway, New York City, has perfected plans for a bond issue of $3,500,000, with the Central Union Trust Co. as trustee.

Bond Offering of Adirondack Power & Light Corp.

The Adirondack Power & Light Corp. has sold an additional block of $1,000,000 first and refunding mortgage 6% bonds, due March 1, 1950, to the Harris Trust & Savings Bank, Coffin & Burr and E. H. Rollins & Sons. The bonds are being offered at 85 and interest, yielding 7¼%.

Offering of Shawinigan Water & Power Co.'s Bonds.

An additional issue of $1,875,000 Shawinigan Water & Power Co. first refunding mortgage 6% sinking fund gold bonds is being offered by a syndicate composed of Lee, Higginson & Co., Brown Bros., Alexander Brown & Son, and Jackson & Curtis. The offering price is 90½, yielding about 6¾%.

Earnings of Rochester Gas & Electric Corp.

In his statement to bankers who are offering $7,000,000 bonds of the Rochester Gas & Electric Corp, Robert M. Searle, president of the corporation, points out that the net earnings available for interest charges are $2,508,760 for the year ended April 30, and that the balance, after all charges, was $1,401,587. He further states that the net earnings, after deducting accruals for replacement reserve, were more than two and one-quarter times the total annual interest charges, including interest on the present issue of bonds. The average net earnings for the last 12 yrs., he points out, after deducting accruals for replacement reserve, have amounted to more than twice the average annual interest charge.

Blackstone Valley Gas & Electric Co.

	1921.	1920.
May gross	$ 280,530	$ 248,099
Net earnings	80,876	69,341
Surplus after charges	52,952	44,481
12 mo. gross	3,374,994	2,949,172
Net earnings	916,764	896,882
Surplus after charges	592,901	598,137

Nebraska Power Co.

	1921.	1920.
May gross	$ 235,906	$ 225,329
Net after taxes	70,630	68,413
Total income	102,069	100,351
Surplus after charges	57,828	67,328
12 mo. gross	3,028,491	2,614,250
Net after taxes	878,104	904,723
Total income	960,353	996,855
Surplus after charges	504,579	612,938
Balance after preferred dividends	294,579	402,938

Texas Light & Power Co.

	1921.	1920.
May gross	$ 353,973	$ 338,309
Net after taxes	99,015	106,397
Total income	100,176	106,612
Surplus after charges	41,731	49,834
12 mo. gross	5,208,159	3,823,758
Net after taxes	1,427,399	1,304,653
Total income	1,432,855	1,310,988
Surplus after charges	723,083	651,688
Balance after preferred dividends	443,083	403,188

Great Western Power System.

	1921.	1920.
May gross	$ 591,093	$ 446,879
Net after taxes	369,330	252,612
Surplus after charges	168,926	96,828
Balance after preferred dividends	156,426	84,328
5 mo. gross	3,052,934	2,317,186
Net after taxes	1,955,149	1,251,851
Surplus after charges	992,706	471,026
Balance after preferred dividends	930,206	408,526

Increase in Earnings of Pacific Gas & Electric Co.

Earnings of the Pacific Gas & Electric Co. for May and the first 5 mo. of the current year show a substantial increase over the corresponding periods of 1920, notwithstanding a reduction of surcharge to electrical rates from 15% to 6% since last year. This was made possible by more economical operating conditions due to a better water supply for hydro electric plants and lower oil prices. Industrial electric power demand has shown some decrease, but this has been more than offset by the addition of householder and other small unit consumers. Total of customers May 31, 1921, was 578,397, an increase of 9,038 since the first of the year and 36,311 during the previous 12 mo. The first two units of the company's new hydroelectric developments on Pit river, aggregating 33,500 hp., will be brought into operation shortly. Earnings for the first 5 mo. of the current year are shown below, with comparison with similar period of 1920:

	1921.	1920.
Gross	$16,140,733	$13,620,745
Net after taxes	6,008,674	4,882,394
Surplus after charges	2,064,632	1,685,723
Balance after accrued dividends on preferred stock	1,184,881	945,795

Northern Texas Electric Co.

	1921.	1920.
May gross	$ 303,362	$ 331,347
Net earnings	107,321	129,206
Surplus after charges	81,933	104,344
12 mo. gross	3,936,682	3,691,526
Net earnings	1,371,961	1,447,566
Surplus after charges	1,069,466	1,149,028

Utah Power & Light Co.

	1921.	1920.
May gross	$ 523,410	$ 482,789
Net after taxes	247,286	202,451
Total income	253,177	216,246
Surplus after charges	115,705	73,707
12 mo. gross	6,842,184	6,073,407
Net after taxes	3,203,810	2,876,264
Total income	3,349,940	3,003,730
Surplus after charges	1,628,875	1,342,740
Balance after preferred dividends	1,037,375	755,877

Manila Electric Railroad & Lighting Corp.

	1921.	1920.
May gross	$ 293,658	$ 261,746
Net after taxes	113,910	98,154
Total income	114,125	98,211
Surplus after charges	78,914	66,290
12 mo. gross	3,582,373	2,863,219
Net after taxes	1,343,248	814,187
Total income	1,344,654	816,805
Surplus after charges	885,571	454,522

Western Union Telegraph Co.

Earnings report of the Western Union Telegraph Co. for the 6 mo. ended June 30, 1920 and 1921 (month of June, 1921, estimated) is as follows:

	1921.	1920.
Gross revenues, including dividends and interest	$52,277,200	$59,963,428
Maintenance; repairs and reserved for depreciation	9,074,700	8,290,763
Other operating expense, including rent of leased lines and taxes	38,469,075	43,939,126
Total expenses	47,543,775	52,229,889
Balance	4,733,425	7,733,539
Deduct interest on bonded debt	665,925	665,925
Net income	4,067,500	7,067,614

San Diego Consolidated Gas & Electric Co.

12 mo. ended May 31.	1921.	1920.
Gross earnings	$3,207,312	$2,365,433
Net earnings	925,347	854,124

Dividends.

	Term.	Rate.	Payable.
Cleveland El. Ilmng., pfd.	Q.	2%	Sept. 1
Dallas Pr. & Lt., pfd.	Q.	1.75%	Aug. 1
Elec. Bond & Share, com.	Q.	2%	July 15
Elec. Bond & Share, pfd.	Q.	1.5%	Aug. 7
Ft. Worth Pr. & Lt., pfd.	Q.	1.75%	Aug. 1
Texas Pr. & Lt., pfd.	Q.	1.75%	Aug. 1

WEEKLY COMPARISON OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeiler & Co., Rookery Bldg., Chicago.

Public Utilities—	Div. rate. Per cent.	Bid July 11.	Bid July 18.
Adirondack Electric Power of Glenns Falls, common	6	9	9
Adirondack Electric Power of Glenns Falls, preferred	6	70	67
American Gas & Electric of New York, common	..	99	98
American Gas & Electric of New York, preferred	6	35½	36½
American Light & Traction of New York, common	..	79	79
American Light & Traction of New York, preferred	6	77	77
American Power & Light of New York, common	4	52	53
American Power & Light of New York, preferred	6	64	64
American Public Utilities of Grand Rapids, common	..	8	6
American Public Utilities of Grand Rapids, preferred	7	18	17
American Telephone & Telegraph of New York	..	103	103
American Water Works & Elec. of New York, common	..	4	3½
American Water Works & Elec. of New York, particip	7	8½	8
American Water Works & Elec. of New York, 1st preferred	..	47½	47½
Appalachian Power, common	..	4	4
Appalachian Power, preferred	7	28	27
Cities Service of New York, common	+extra	114	112
Cities Service of New York, preferred	6	41	41
Commonwealth Edison of Chicago	8	108	109
Comm. Power, Railway & Light of Jackson, common	..	9	9½
Comm. Power, Railway & Light of Jackson, preferred	6	28	29
Federal Light & Traction of New York, common	..	6	5½
Federal Light & Traction of New York, preferred	..	41	39
Northern States Power of Chicago, common	..	44	41
Northern States Power of Chicago, preferred	ex.div. 7	78	78
Pacific Gas & Electric of San Francisco, common	..	53	53
Public Service of Northern Illinois, Chicago, common	7	78	79
Public Service of Northern Illinois, Chicago, preferred	6	80	80
Standard Gas & Electric of Chicago, common	..	9	8½
Standard Gas & Electric of Chicago, preferred	8	31½	31½
Tennessee Railway, Light & Power of Chattanooga, common	..	1	¾
Tennessee Railway, Light & Power of Chattanooga, preferred	6	4	3½
Western Power of San Francisco, common	..	23	23
Western Union Telegraph of New York	..	86¼	84
Industrials—			
General Electric of Schenectady	8	127½	119
Westinghouse Electric & Mfg. of Pittsburgh, common	7	44	42